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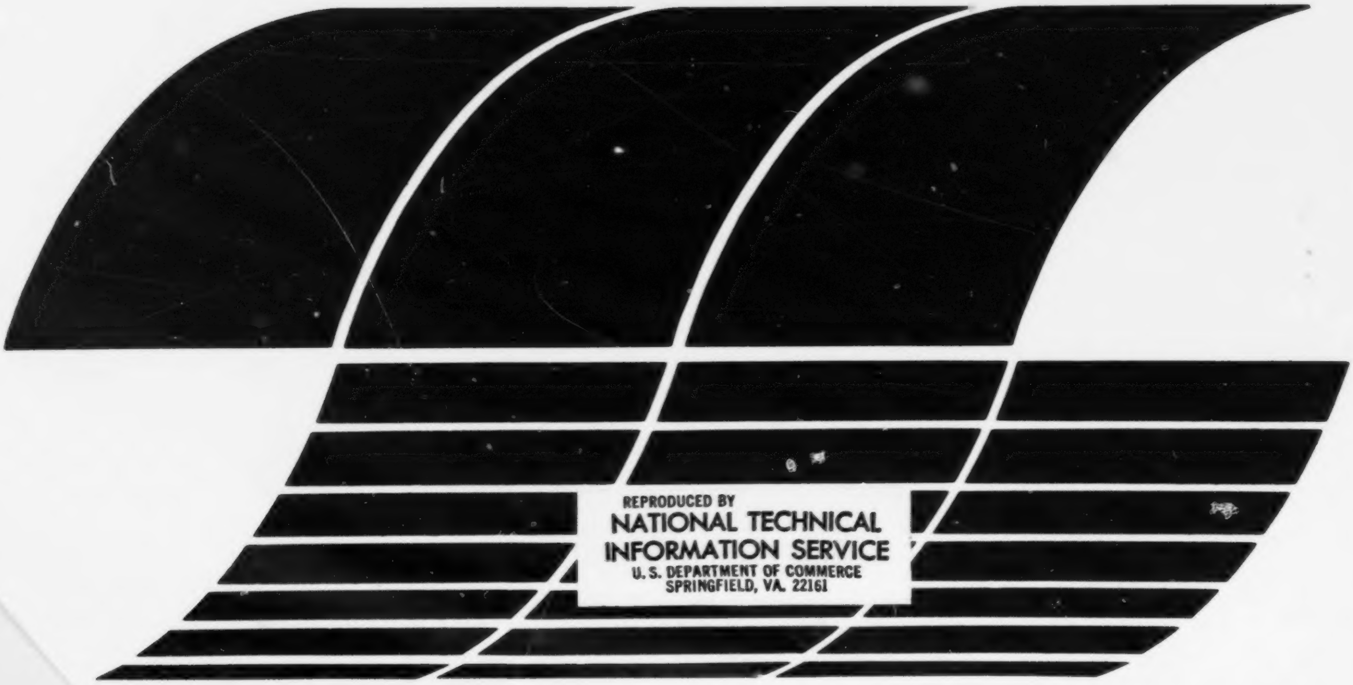

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A study was conducted of small petroleum production and petroleum products distribution facilities (stripper wells and bulk plants) to determine ability to comply with the oil pollution regulation (40 CFR Part 112). Four regions of the United States were covered: Texas/Oklahoma, Louisiana, Penn-Grade (Pennsylvania, Ohio, Kentucky, West Virginia, New York), and New England. Field surveys were conducted at 125 individual facilities: 55 production facilities and 18 bulk plants in the Penn-Grade region, and 17 bulk plants in New England. The facilities themselves were categorized into generic types, both within regions and across-the-board.

Numerous technical problems were identified involving the ability of these facilities to comply with the regulation and the techniques selected by the owners and operators to achieve compliance. The problems and compliance techniques were evaluated for both appropriateness and cost. The problems were also screened and grouped in categories of problems most common to all facilities, both by facility type and geographic area. Engineering solutions have been proposed for these most common problems, with emphasis on the most cost-effective solutions.

Existing spill prevention, control and countermeasure (SPCC) plans (required by the regulation) for the facilities visited were reviewed and assessed for adequacy if the owners/operators made them available. Finally, for the several generic types of facilities identified, SPCC plans were developed. Each generic SPCC plan serves as a model for any facility of the type covered and requires modification only to account for minor variables peculiar to a specific site.

This report was submitted in fulfillment of Contract No. 68-03-2032 by Science Applications, Inc., under the sponsorship of the U. S. Environmental Protection Agency. This report covers the period July 1974 through January 1977. Nearly all of the field work (surveys) was completed during the last half of 1974, however.

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FOREWORD

When energy and material resources are extracted, processed, converted, and used, the related pollutional impacts on our environment and even on our health often require that new and increasingly efficient pollution control methods be used. The Industrial Environmental Research Laboratory-Cincinnati (IERL-Ci) assists in developing and demonstrating new and improved methodologies that will meet these needs both efficiently and economically.

This study was made in response to the oil pollution prevention regulation (40 CFR 112) promulgated by the U. S. Environmental Protection Agency on December 11, 1973. The regulation covers spill prevention and control for nontransportation-related, on-shore and off-shore facilities. The measure requires that owners and operators of affected facilities prepare and implement a spill prevention control and countermeasure (SPCC) plan for each facility (40 CFR 112.3(a)) and, further, that each Plan be certified by a registered professional engineer (40 CRF 112.3(d)).

The purposes of this study were to identify SPCC practices at small petroleum facilities, to determine technical problems as they related to spill prevention and control at these facilities, and to devise alternative feasible engineering solutions to overcome problems and assure compliance with the regulation and guidelines (40 CFR 112.7)).

David G. Stephan
Director
Industrial Environmental Research Laboratory
Cincinnati

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A study was conducted of small petroleum production and petroleum products distribution facilities (stripper wells and bulk plants) to determine ability to comply with the oil pollution prevention regulation (40 CFR Part 112). Four regions of the United States were covered: Texas/Oklahoma, Louisiana, Penn-Grade (Pennsylvania, Ohio, Kentucky, West Virginia, New York), and New England. Field surveys were conducted at 125 individual facilities: 55 production facilities in the Texas/Oklahoma region, 15 production facilities in Louisiana, 20 production facilities and 18 bulk plants in the Penn-Grade region, and 17 bulk plants in New England. The facilities themselves were categorized into generic types, both within regions and across-the-board.

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CONVERSION FACTORS

U. S. AND METRIC UNITS

Each unit in *Italic* type is followed by its equivalent in other units of the same quantity.

Acre — 0.0015625 square mile (statute): 4.3560×10^4 square feet; 0.40468564 hectare.

Barrel — 42 gallons.

Centimeter — 0.0328084 foot; 0.393701 inch.

Circular Mil — 7.853982×10^{-7} square inches; 5.067075×10^{-6} square centimeters.

Cubic Centimeter — 0.061024 cubic inch; 0.270512 dram (U. S. fluid); 16.230664 minims (U. S.); 0.999972 milliliter.

Cubic Foot — 0.803564 bushel (U. S.); 7.480520 gallons (U. S. liquid); 0.028317 cubic meter; 28.31605 liters.

Cubic Inch — 16.387064 cubic centimeters.

Cubic Meter — 35.314667 cubic feet; 264.17205 gallons (U. S. liquid).

Foot — 0.3048 meter.

Gallon (U. S. liquid) — 0.1336816 cubic foot; 0.832675 gallon (British); 231 cubic inches; 0.0037854 cubic meter; 3.785306 liters.

Inch — 2.54 centimeters.

Kilogram — 2.204623 pounds (avoirdupois).

Kilometer — 0.621371 mile (statute).

Meter — 1.093613 yards; 3.280840 feet; 39.37008 inches.

Mile (statute) — 1.609344 kilometers.

Square Centimeter — 0.155000 square inch.

Square Foot — 0.09290304 square meter.

Square Inch — 645.16 square millimeters.

Square Meter — 10.763910 square feet.

Square Yard — 0.836127 square meter.

Ton (short) — 907.18474 kilograms.

Yard — 0.9144 meter.

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SECTION 1

INTRODUCTION

EPA'S OIL POLLUTION PREVENTION REGULATION

EPA's OIL POLLUTION PREVENTION REGULATION (40 CFR 112) was promulgated on December 11, 1973, as a key element in the efforts of the U.S. Environmental Protection Agency (EPA) to prevent, control and assure accountability for oil spilled into the navigable waters of the United States or the adjoining shorelines. The objective of the regulation is to prevent such spills as they might occur, or reasonably be expected to occur, from nontransportation-related, on-shore and off-shore facilities. In short, the regulation covers owners and operators of nontransportation-related facilities that are in any way engaged in production, processing, refining, distribution and consumption of petroleum and petroleum products so long as the storage capacity at any facility exceeds the limitations established by the regulation. For aboveground storage, the limit is a total storage capacity of 1,320 gallons, or a single container with a capacity of 660 gallons. For underground storage, the limit is a total of 42,000 gallons.

In effect, the first limitation exempts individuals such as householders and other similar low-volume users from compliance with the regulation. The second limitation effectively exempts such facilities as most local service stations from the regulation. Thus, the purpose of the regulation is met by providing for spill prevention and control accountability on the part of all other elements of the petroleum industry, in addition to all industrial users of petroleum and petroleum products who exceed the above storage quantity limitations. It is also notable that all departments, agencies and instrumentalities of the Federal Government are subject to the regulations on the same basis as private enterprise, with the exception of the penalty provisions.

The regulation has two unique features designed to promote assurance that all covered petroleum producers and users do, in fact, take positive steps toward spill prevention and control, and that those steps form the basis for accountability. The first of these features is the requirement that the owner/operator develop, document, implement and maintain a spill prevention, control and countermeasure (SPCC) plan for each affected facility; the second is the requirement that each SPCC plan be certified by a registered professional engineer (PE) before it can become effective under the regulation. Thus not only must specific SPCC features be prescribed by the facility owner/operator, but assurance is gained that those features are based on sound engineering practice as it relates to each individual facility.

The regulation includes a number of facility design and operating guidelines for spill prevention and control, and each owner/operator is afforded flexibility in determining the proper methods for each facility within the framework of these guidelines (section 40 CFR 112.7 of the regulation). This intent recognizes that each facility is different because of topography, relationship to waterways, location and siting.

SCOPE OF THE STUDY

The study was limited to independent producers and distributors, i.e., the smaller business units in the petroleum industry. This emphasis was based on the notion that these firms and individuals would be the parties encountering the greatest difficulty in complying with the oil spill prevention regulations and, therefore, that the problems and solutions of these industry elements concerning the regulation would be of special interest. For these reasons, in the oil production sector, heavy emphasis was given to stripper wells, although a number of higher-production wells were included in view of their location with respect to waterways. Likewise, the distribution facilities survey was concentrated on the smaller bulk plants, although several larger installations were included, either because of their locations or because they demonstrated peculiar siting problems.

The surveys themselves were conducted in four geographical regions of the United States -- three surveys for production facilities, and two for distribution facilities. These are discussed below.

Production Facilities Survey

Field surveys of production facilities concentrated on stripper wells and were conducted in the Texas/Oklahoma area, the Louisiana area and the Penn-Grade area. These three areas were selected for two reasons. First is that all exhibit difficult terrain features with respect to spill prevention and control, and second, there are large concentrations of stripper wells in these regions.

In the Texas/Oklahoma area, the terrain runs from coastal wetlands to arid plains. The Louisiana area, with extensive oil production in the Mississippi valley and bayou areas, exemplifies the most difficult protection conditions with respect to waterways. The Penn-Grade area, most of which is located in the most rugged areas of the Appalachians, typifies the spill prevention and control problems encountered in mountainous terrain, especially mountainous terrain with substantial annual rainfall and numerous rivers and streams.

In addition to the difficult terrain conditions exemplified by these areas, they are of further importance because of the very large number of strippper wells they contain. As Table 1 indicates, these three areas account for more than 65 percent of the U. S. stripper wells. The Texas/Oklahoma

TABLE 1. STRIPPER WELLS AND PRODUCTION IN THE THREE SURVEY AREAS*

Region and States Included	Number of Stripper Wells	% of U. S. Total*	Annual Production from Stripper Wells (bbl)	% of U. S. Total†
Texas/Oklahoma:				
Texas	87,412	23.9	126,386,936	30.7
Oklahoma	59,817	16.3	73,694,737	17.9
Total	147,229	40.2	200,081,673	48.6
Penn-Grade:				
Pennsylvania	32,095	8.8	3,399,000	0.82
Ohio	15,406	4.2	6,361,600	1.54
Kentucky	13,914	3.8	6,463,912	1.57
West Virginia	13,600	3.7	2,763,000	0.65
New York	4,828	1.3	896,000	0.22
Total	79,843	21.8	19,883,512	4.80
Louisiana	12,808	3.5	7,501,798	1.8
Total	239,880	65.5	227,376,983	55.2

* Source: *National Stripper Well Survey*, January 1, 1975, Interstate Oil Compact Commission, Oklahoma City, Oklahoma.

† U. S. totals: Stripper wells — 366,095; stripper well production — 411,936,033 barrels.

area is of special interest, since it accounts for nearly 49 percent of U. S. stripper well production. Although the Penn-Grade area accounts for less than 5 percent of total U. S. stripper production, it is also of special interest because the oil produced is extremely high quality lubricating oil, and the area holds nearly 22 percent of U. S. stripper wells.

Finally, it should be noted that the surveys did not attempt 100 percent coverage of each region. Rather, it was necessary to select sub-areas that would typify the terrain features of interest as they relate to a wide variety of production facilities.

Distribution Facilities Survey

This survey was concentrated in two regions — New England and Penn-Grade.* The New England region was selected for primary study because it has a very large number of distribution facilities (bulk plants), especially so in proportion to its population. The region is largely dependent on fuel oil for heating, since it has no oil production, and very little natural gas is piped into the region. Therefore, the fuel oil, in addition to other refined bulk petroleum products, has to be transported into the region by surface carriers. This situation has given rise to the large number of distribution facilities.

Although the bulk plant survey was concentrated in the New England region, opportunities did arise during the surveys in the other three regions to observe a number of bulk plants. This was particularly true in the Penn-Grade area where, again, the rugged terrain was of special interest as it related to facility siting and spill prevention and control problems.

OBJECTIVES OF THE STUDY

Overall, the study had three broad objectives. They were:

1) To determine the technical problems the facilities have in complying with the regulation and what cost-effective technical solutions are available for these problems

2) To determine, in general, the costs of compliance with the regulation, i.e., the costs of preparing and implementing SPCC plans

3) To prepare a manual that delineates the technical problems and alternative solutions to aid facility owners/operators in complying with the regulations.

The first objective is succinctly discussed in Section 2. The second objective was aimed at determining the actual cost the facility owners/operators experienced in complying with the oil spill prevention regulations. Because of the critical differences in the economic impact of one-time costs (i.e., initial investment) and ongoing costs (i.e., operating costs), the objective had to be considered as having three elements:

1) The cost of preparing SPCC plans

---

* Because of the similarity of the conditions under which the distribution facilities were found in each of these two regions, they will be discussed as one (New England) in this section of the report, and reference to the Penn-Grade area will be to indicate a unique situation or to stress a particular point further.

2) The cost of PE certification of the plans

3) The cost of implementing the plans.

The first two of these are one-time costs, unless the SPCC plans have to be revised in the future as facilities are altered and operations are changed. Any substantial revisions would require recertification of the plan. These two cost items are of special interest because they are wholly new costs to the facilities covered by the regulation; that is, owners/operators have never before had to incur such costs.

Accordingly, depending on the interpretation of the regulation by any individual owner/operator, these costs can vary widely. For example, an owner/operator can prepare the plan himself, then hire a PE for the certification. Or he might hire the PE both to prepare and certify the plan. Should the owner/operator happen to be a PE (as is true in some cases), he can do the preparation/certification personally. These costs can also vary substantially when an independent PE is hired for the job, depending on the PE's interpretation of the regulation.

The latter factor can also heavily impact the costs of implementing the plan. The independent PE's interpretation may be such that, depending on the status of the facility in question, he will opt for extreme (and expensive) engineering measures for spill prevention and control before he will certify the plan. Or he may determine that existing protection at the facility is adequate and recommend no changes. Furthermore, should it be determined that preventive measures are impractical and a contingency-type plan is needed for a facility, plan implementation costs vary widely. Such costs will depend on the facility's site-specific problems and whether or not the owner/operator implements the contingency plan with all in-house personnel or subcontracts a part or the whole implementation phase of the contingency plan.

Thus, the compliance cost determination objective has many facets. In particular, it was necessary during the surveys to determine the requirements of the SPCC regulation that resulted in the specific courses of action taken by facility owners/operators.

The third study objective of preparing a technical manual relates directly to and, in fact, stems from the first two objectives. It was noted earlier that the study emphasis was on practical, cost-effective solutions to technical problems experienced by the facilities in complying with the regulation. In keeping with this focus, a variety of technical solutions are presented in Section 4 and in the Appendices, both of which constitute the technical manual of alternative solutions required by this third major objective.

SECTION 2

CONCLUSIONS

The survey conclusions presented here address the facility design and operating factors that must be changed to prevent oil spillage, and the response measures required if and when an oil spill reaches navigable waters. The conclusions are presented in five parts: The general conclusions applicable to the facilities in all areas surveyed and conclusions specific to each of the four areas surveyed.

GENERAL CONCLUSIONS

Some of the problems that the facilities faced in complying with the oil spill prevention regulation were independent of geographic location. As might be expected, the small operators generally seek to comply either by hastily preparing a poor SPCC plan and finding a PE to certify it, or by using a standard SPCC plan format but failing to implement an adequate plan. This approach does not solve the oil spill prevention problem and may result in fines from EPA for inadequate plans. An adequate SPCC plan generally means that a facility needs a good operations and maintenance plan including personnel training, inspections with checklists, routine preventive maintenance and the incorporation of fail-safe systems. Of course, some facilities were poorly designed and required basic changes to prevent oil spillage.

Spill data recently compiled by the U. S. Environmental Protection Agency for petroleum marketing distributors, bulk storage and production operations (see Table 2) indicate that the great majority of spills are the result of equipment failure and personnel errors. These data are consistent with the findings of this study and suggest that if good SPCC plans are prepared and implemented by the facility owner/operators, that the opportunity for the occurrence of a spill would be minimized.

Facility Design and Maintenance

Maintenance of facility equipment, tanks and piping was generally observed to be out of keeping with good engineering standards and specifications. Unless properly maintained, this equipment will cause oil spillage through leaks or malfunctions. Corrosion, leaky seals and gaskets are all functions of wear life and ultimately cause oil spillage if not corrected.

The most common and economical means for preventing oil spillage from entering navigable waters is to construct an earthen dike around the facility.

TABLE 2. SPCC STATISTICS*

Cause of spill	Number of spills resulting from a specific type of operation		
	Marketing distribution Total spills — 304	Bulk storage† Total spills — 89	Production Total spills — 456
Casualties:			
Overturning (capsizing)	1	1	0
Collision with vehicle	9	1	0
Explosion	0	0	1
Fire	3	1	2
Grounding	0	0	0
Sinking	0	0	0
Well blowout	0	0	7
Other	3	1	4
Total	16	4	14
Equipment failures:			
Alarm	0	0	2
Automatic shutdown	1	0	7
Corrosion, pipe	19	1	41
Corrosion, tank	27	5	14
Defective valves	14	5	96
Hose rupture	11	2	3
Pipe rupture	10	6	40
Pump	8	1	19
Tank rupture	13	8	5
Weld failure, factory	0	0	1
Weld failure, field	0	0	1
Other	34	16	55
Total	137	44	284
Personnel errors:			
Incorrect valve handling	15	6	18
Improper hose connection	10	0	0
Improperly secured flanges	4	0	2
Tank overflow	74	20	43
Other	23	6	17
Total	126	32	80
Deliberate discharges:			
Dumping	8	0	4
Disposal of waste oil	3	1	1
Pumping ballast	0	0	0
Pumping bilges	0	0	0
Vandalism	7	4	29
Other	1	0	3
Total	19	5	37
Natural phenomena:			
Flooding	3	1	14
Freezing	0	0	6
Heavy seas	0	0	0
Heavy winds	0	1	1
Natural seepage	2	1	3
Other	1	1	17
Total	6	4	41

* Data base supplied by T. Charlton of the U. S. Environmental Protection Agency (1976).

† "Bulk storage" is a broad generic category and may include some data from marketing or production facilities. Any data listed under "bulk storage" are not duplicated elsewhere.

Most of the facilities had dikes, but the earthen dikes were generally observed to be poorly designed, constructed, and maintained. A good dike design should include a drawing showing critical dimensions, specification of construction materials, specification of soil compaction and construction methods and provisions for drainage and oil/water separation, recovery and disposal. Allowing standing oil/water to accumulate within the diked areas was observed to be not only a poor housekeeping/facility maintenance practice, but also a potential oil spill problem. Heavy rainfall combined with the continued accumulation of oil spillage within the dike could overflow the dike and eventually flow into navigable waters. If designed, constructed and maintained properly (according to good engineering practices), earthen dikes, where feasible, represent the most effective and economical technique for containing oil spillage and complying with the oil spill prevention regulation.

Facility transfer operations were also considered a major compliance problem. Substandard facility operations and procedures were observed to be a major source of oil spillage from overfilling of storage tanks and tank trucks, leakage during hose connection/disconnection, spillage during tank sampling and water drawdown and premature tank truck departures. Most of these problems were related to human error and could be economically corrected by formulating a good operating procedures manual for the facility.

TEXAS/OKLAHOMA AREA

This part of the survey dealt with stripper wells that were mostly in dry, arid geographical locations far removed from water. Some of the facilities would not require an SPCC plan according to 40 CFR 112.1. However, in this area, the two defined modes of oil spillage that could result in water contamination are the result of rainwater runoff and the direct spillage into standing bodies of water.

Specific facility deficiencies were observed to be related to the following:

- Most facilities are remotely located, largely unattended, and without electrical power lines, making spill detection/alarm and reasonable response time in case of major oil spills very difficult.
- The oil/water separators (typically of the gun-barrel design) are designed in such a way that if the level control valve malfunctioned, considerable oil spillage could occur.
- Production facilities in grazing areas are unfenced (a security item) and accessible to grazing livestock that could cause equipment damage and potentially result in oil spillage.

The SPCC plans reviewed in this area followed a standard format and were lacking in good engineering design and practice required to overcome the above-mentioned problems. Some of the plans merely stated that because of location with respect to a waterway, no further action was required of the owner/

operator (which in some cases was true). For facilities requiring an SPCC plan, sample generic plans are included in the Appendix of this report for use as guidelines in preparing plans aimed at the specific facility problems encountered in the Texas/Oklahoma area.

LOUISIANA AREA

This survey involved two types of facilities characteristic of this area: 1) on-shore and 2) water-based. Water-based facilities include facilities constructed away from shore over the water and usually mounted on pile-supported platforms. On-shore facilities (or shore-based) include facilities constructed along the shore and many times are part of the water-based facility's operation. The problems encountered with the on-shore facilities were solvable using previously mentioned conventional techniques, including secondary containment dikes. Here heater-treaters were used for oil/water separation and the production wells were of greater capacity than stripper wells (i.e., 10 bpd). However, the water-based facilities were remotely located in marshlands and bayous, usually unmanned, and presented complex problems for the preparation and implementation of adequate SPCC plans.

Although the water-based facilities problems were complex, the SPCC plans were simple, followed a standard format and did not reflect good engineering thought and solutions to the difficult problems. The major complexities at these facilities included the following:

- Oil production wells and loading facilities were mounted on piles in mid-stream of the waterways
- Rise and fall of the water level due to flooding can be as much as 13 feet* in the Mississippi Spillway -- this mostly affects the shore-based storage tanks and oil/water separators
- Unless carefully designed,earthen dikes, drainage and disposal pits will not work here due to high soil permeability
- Over-water piping was largely unprotected against leakage directly into the water from joints, flanges and pipe corrosion
- Heavy waterway traffic causes water-induced soil erosion along the shoreline, including storage tank dikes located close to the shore.

Suggested solutions to these problems are included in the generic SPCC plans found in the Appendix section of this report and are summarized below:

- A closed drainage system should be designed for the over-water pipes, water-based well and shoreline storage tanks (typical designs are included in the Appendix section of this report)

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* The audience reached by this report will be more familiar with the English system of units rather than the Metric System of units -- therefore, its use (see p. xi of the report for Metric Conversion Table).

- To prevent soil/dike erosion caused by excessive waterway traffic, bulkheads should be designed for shore-based facilities

- Polyethylene (or equivalent material) liners should be used in all earthen dikes, and in drainage and disposal pits

- A strong drainage and maintenance plan for all dikes and pits should be required for facilities where periodic flooding occurs; also, a strong contingency plan should be required, with specified spill control equipment and designated/trained response teams.

PENN-GRADE AREA

This part of the survey covered both stripper well and bulk distribution facilities in the Pennsylvania, Ohio, and West Virginia areas.* Most of the production facilities surveyed were very small, less than 1 barrel per day (bpd), and family-owned (called "Ma and Pa"). Very little evidence of spillage was found, and the potential for large spills was small for the facilities surveyed. However, the facilities were located in mountainous and hilly areas. The streams flowing in the valleys provided the potential for contaminating bodies of water. The local soil was generally considered adequate for constructing impervious earthen dikes and drainage pits that would prevent spills from entering these water courses.

Specific problems encountered in production were:

- The hilly terrain made diking difficult, and many sites had either poorly constructed diking or none at all.

- The production facilities were very small and unattended. They had not cost-effectively implemented a good SPCC plan requiring maintenance of equipment, corrosion protection and protection against leaks and spills.

- Many oil/water separators were undersized, with no overflow protection, and had no secondary containment system or high-level alarms.

- Roadside storage tanks without security fences (and thus vulnerable to being hit by tank trucks and other vehicles) and without protection against tank overfilling and oil transfer spills were common.

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* Since the conditions relating to the bulk distribution facilities in the Penn-Grade area are similar to those encountered in the New England area, all discussions of the bulk distribution facilities for these two areas are found under Bulk Plants — Penn-Grade/New England Areas.

- The combination drainage ditch/pit arrangements used at many sites were underdesigned and were improperly designed for uncontrolled syphon-drain without oil/water separation, discharge inspection or security provisions.

Recommended solutions to these problems are included in the generic SPCC plans found in the Appendix section of this report and are summarized below:

- Earthen dikes, drainage ditches and pits on hilly terrain should be designed for:
    - Capacity (rainfall plus oil spillage) of largest single tank or process unit
    - Diversion of runnoff water around ditches and pits
    - Provision for routine inspection of rainwater before discharge (discharge valve must be securely closed) taking maximum advantage of the slope of the land when possible
- In case of control valve malfunction, oil/water separators should have automatic high-level shut-off valves and dikes
- Since many of these facilities appeared to be old, with deteriorating equipment:
    - Hydrostatic testing (or the equivalent thereof) of all pipes, tanks, valves and connections should be conducted
    - All worn-out, leaky parts should be replaced
    - Cathodic protection systems should be used to prevent underground pipe and tank corrosion
- Roadside storage tanks should be diked to contain an oil spill and divert highway drainage or, if located in close quarters, should have steel/concrete curbing with grading designed for oil/water flow into a drainage trench and ultimately to a remotely located containment pit for proper treatment and disposal.

BULK PLANTS — PENN-GRADE/NEW ENGLAND AREAS

Although a number of the General Conclusions apply to bulk plant design and operations, the differences between this type of facility and oil production facilities are such that more complete treatment of those conclusions is needed to provide the clarity not afforded by a blanket statement. Since these facilities are typically located within cities and towns where spills (especially major spills) present numerous hazards to the environment and human safety, protection against spills from bulk plants is of further critical interest. Moreover, bulk plants observed during this survey are typical of such facilities anywhere in the country, so the conclusions given below can be considered as applicable nationwide:

- Maintenance items such as repairs to leaking valves and cleaning and painting of piping and vessels that are typically covered by SPCC plans are not regularly performed.
- Many bulk plants and tank truck loading-unloading facilities are often squeezed into limited space, making secondary containment, drainage, and disposal difficult to design and implement.
- Bulk plants are not often surrounded by fencing, and they have insufficient lighting to help prevent equipment damage and spills resulting from vandalism.
- For relatively inexpensive solutions to spill control problems, unique terrain features of bulk plant properties and natural slopes should be taken advantage of when possible.
- Color-coding and labeling of piping and rapid positive identification of contents were needed at most bulk plants.
- Some facilities were located adjacent to municipal storm sewer basins without provisions for preventing spills from entering them.

Recommended solutions to these problems are included in the generic SPCC plans located in the Appendix of this report and are briefly summarized below:

- Techniques for overcoming space limitation problems include:
    - Use of steel-reinforced concrete rather than earthen dikes
    - Use of trenches or drain pipes leading to remotely located oil/water storage
    - Oil/water separation and water discharge facilities (which requires an NPDES permit)
    - More frequent inspections and routine maintenance
- Security appears to be uniquely important for these facilities and should include strong fencing, ample lighting, and, through the implementation of good security measures such as plant component locking, inaccessibility of the facility.

SECTION 3

SURVEY METHODOLOGY

INTRODUCTION

The fundamental requirement in conducting the study was to assure that the status and needs of the industrial sectors of interest would be appropriately covered with respect to the oil spill prevention regulations. However, resources available for the study did not permit detailed study in all areas of the country. A progressive selection procedure was therefore employed to identify areas for the survey that would demonstrate conditions of such facilities wherever they might be located.

AREA SELECTION PROCEDURES

The first step in this procedure was to meet with EPA Regional Office staff members directly involved in administering the regulation (the exceptions were EPA Regions 4 and 9, where it was determined, after consultation with EPA headquarters representatives, that an insufficient variety of facilities existed to make them good candidate areas for study). The Regional Office staff were solicited to learn what the industry's experience had been in their areas in complying with the regulation. Additionally, those staff members were asked to identify the industry trade associations and individuals in their regions who are recognized leaders in the petroleum production and products distribution industries.

The next step was to contact the identified leaders and to solicit their views on the regulation's impact and of the modes and techniques of compliance available to and favored by their member owner/operators. Finally, these industry representatives were requested to suggest individual owners/operators who might be amenable to having study team members visit their properties. It was also requested that these owners/operators and their properties be selected for representation of typical SPCC problems, peculiar site problems and for indication of good engineering practice in complying with the regulation. Some of those facilities were visited for observation of SPCC problems and solutions, and for discussion with the owners/operators.

The purpose of this "first round" of discussions and visits was to determine the extent of compliance problems — the regulation's impact in the several regions, to serve as the basis for selection of areas for detailed survey.

SELECTION OF THE FOUR SURVEY AREAS

As a result of all the inputs gained through the procedure outlined above, the Texas/Oklahoma, Louisiana, Penn-Grade and New England areas were selected for detailed survey. Additional input to this decision was gained from further discussions with EPA representatives and trade association officials. For the four areas selected, these two groups also provided major assistance in the development of a roster of facilities that would be visited during the surveys. The trade association officials were particularly helpful in arranging the study team's initial contacts with the facility owners/operators.

THE AREA SURVEYS

Within each of the four areas selected for detailed survey, a number of individual facility owners/operators were contacted, with the request that study team members be permitted to visit specific facilities. Where agreement was achieved, the team members then visited the facilities with four objectives to be accomplished:

1) To review and analyze individual facility SPCC plans and acquire copies, if available. The plans were not always available at the facilities, since the owner/operator might keep them at his central office which, in many cases, is quite some distance from the facility.

2) To discuss with the owner/operator the actions they had deemed necessary at the facility to comply with the regulation, and the reasons for settling on particular courses of action. The owners/operators were also requested to furnish information on the costs incurred or necessary to implement the spill prevention and control actions, especially where construction was involved, and the costs incurred for Registered Professional Engineer certification of the SPCC plans.

3) To inspect the facility to observe its operating conditions, the spill prevention and control provisions and its remaining spill prevention and control needs. Where permission could be obtained, photographs were taken of the facilities, their relationship to the surrounding land areas, and the provisions for spill prevention and control.

4) To prepare a set of notes describing the facilities and the operating practices, emphasizing the spill hazards and the prevention and control provisions. Sketches were also made of the facilities' layouts, with more detailed sketches indicating the spill hazards and the prevention/control provisions.

AREA SURVEY SUMMARIES

At the conclusion of the facility survey in each of the four geographic areas, the study team conducted detailed reviews of the results of the many facilities visits made and developed summaries for each area. The purpose of these reviews and summaries (which are presented in Chapter 4, Results and Discussions) were:

- To determine the generic types of facilities found in each area, so that broad, yet accurate, descriptions could be prepared that would indicate to future users of the report just what they might expect to find upon entering the areas.
- To prepare, for each generic type of facility, an SPCC plan that would, if implemented, provide adequate spill prevention and control for that type of facility. Thus, users of the report are afforded a vehicle for comparing the adequacy of actual facility SPCC plans they might come upon at facilities, not only in the survey areas, but in any area of the U. S. where facilities are encountered that fit any of the identified generic types.
- To determine the technical problems involved in the achievement of adequate spill prevention and control at facilities in each area.
- To prepare a set of alternative technical solutions (i.e., engineering solutions) for each of the problems identified, so that users of the report will have available a range of suggested solutions that might be employed at any given facility. For each technical solution, an implementation cost estimate was prepared. To the maximum extent possible, these cost estimates have been based on data given by *Means Construction Cost Index (1974)* to assure that the estimates are standardized and therefore indicative of costs any owner/operator might expect to incur in utilizing any of the solutions. Since these estimates are based on 1974 index data, they would have to be updated to the year in which they are used by applying a multiplier that will reflect the annual rate of increase in construction costs since 1974.

The principal study interest was focused on the smaller facilities in the production and distribution industries. For this reason, in reviewing the survey results and developing the summaries, concerted attention has been given to small-facility problems. Therefore, in developing the generic facility SPCC plans and the alternative technical solutions to specific spill prevention and control problems, every effort has been made to identify the most practical and cost-effective solutions.

SECTION 4

RESULTS AND DISCUSSION

INTRODUCTION

This chapter presents the summaries of the surveys conducted in each of the four survey areas, i.e., Texas/Oklahoma, Louisiana, Penn-Grade and New England. To promote easy use of the information presented, each of the summaries is subdivided into the following sections:

- Discussion of the overall survey region, with a map showing the more specific areas in which the survey was concentrated. Included is information describing the number, types and concentrations of facilities within the survey area.
- Description of the survey area, including terrain, soil type(s) and climatology. To the extent possible, photographs are included.
- Descriptions of the different types of facilities encountered during the survey, with breakdowns into generic types (figures and photographs) and discussions of the operating procedures and characteristics of each generic facility type.
- Technical problems encountered at the facilities with respect to spill prevention and control and alternative technical solutions to those problems, including implementation cost data for the solutions. Again, photographs and sketches are included for clarification.
- Discussion of existing SPCC plans for the facilities, including information indicating the costs of preparation, certification and implementation as experienced by and when available from the various owners/operators surveyed.

The essential purpose of this final overall summary section is to demonstrate the commonality of spill prevention and control among the types of facilities of interest — wherever they may be found — and, therefore, to demonstrate that the study's results are applicable to all similar petroleum production and products distribution facilities nationwide.

TEXAS/OKLAHOMA AREA

Introduction and Summary

The objective of this portion of the study was to survey a representative sample of the stripper well industry in the Texas/Oklahoma area in order to determine the technical problems these facilities are experiencing in complying with 40 CFR Part 112, and to recommend a number of alternative solutions to these problems. Due to their location, some stripper wells probably do not require an SPCC plan according to 40 CFR 112.1, (b) and (d); (4). These solutions have taken the form of the preparation of generic SPCC plans which can be implemented by the majority of stripper well owners/operators at a reasonable cost and yet provide adequate protection to the environment. The generic SPCC plans are given in Appendix E.

The Texas/Oklahoma survey region was divided into four geographical types of areas, only three of which have distinct geological and climatological features. These areas are shown on the map in Figure 1 and are described below:

- Area 1 — West Texas between the cities of Fort Worth, San Angelo, Odessa, Lubbock and Wichita Falls; Oklahoma between the cities of Durant, Sopulpa, Muskogee and Hugo. These two areas, being similar, were combined into Area 1.
- Area 2 — East Texas between the cities of Silsbee, Liberty, Crockett, Palestine, Athens, Sulphur Springs, Atlanta and the Louisiana state line.
- Area 3 — Texas coastal areas between Freeport, Houston, Beaumont, Orange, Louisiana state line and the Gulf coast; also, the area around Corpus Christi, bounded by Port Lavaca, Beeville, Mathis, Alice and Falfurrios.

Approximately 55 facilities were surveyed in the Texas/Oklahoma area; 20 in each of Areas 1 and 2, and 15 in Area 3. All of the facilities surveyed were of the stripper-well type which, by definition, are those that produce less than 10 bbls of oil per day per well. These facilities are generally owned by small independent operators, and many of the operations are economically marginal. Thus, a minimum amount of investment capital is available for facility improvements. However, the total yearly production of oil from these stripper facilities in this area is not insignificant (~ 200,000,000 bbls) when compared to the entire U. S. domestic production.

Most of the SPCC plans that were reviewed in this area followed the American Petroleum Institute (API) suggested format (API Bulletin D-16). Many of the very small operations surveyed had no SPCC plans at all and may not have required one. The majority of plans that were reviewed indicated a lack of thought and ingenuity. Statements in the plans regarding inspection, training, and recordkeeping appeared mimicked and, though not proven so, were probably

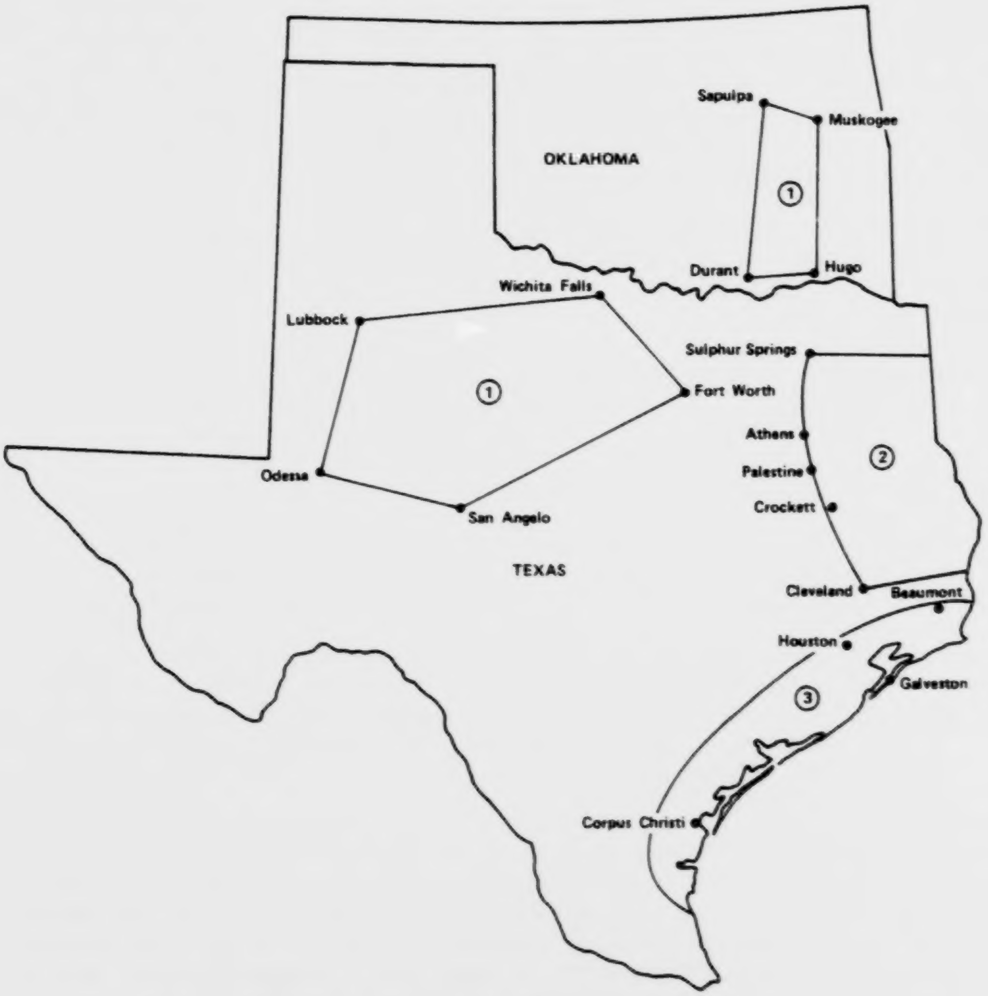

OKLAHOMA
Sapulpa
Muskogee
①
Durant
Hugo
Wichita Falls
Lubbock
①
Sulphur Springs
Fort Worth
Athens
②
Palestine
Odessa
Crockett
San Angelo
TEXAS
Cleveland
Beaumont
Houston
Galveston
③
Corpus Christi

Figure 1. Geographic areas of Texas-Oklahoma covered by the survey.

never implemented. The fact that the pumpers were generally unfamiliar with these plans tends to support this conclusion.

Although not documented, it seems reasonable that any major oil spills (10,000 gallons or about 240 bbl) would most likely occur through human error, i.e., unloading or leaving drawdown valves open and unattended for substantial time periods or through catastrophic failure (storage tank or other vessel rupture). Even though such events are infrequent, protection against them should be provided.

The average storage tank capacity is 500 bbl, with a minimum of 250 bbl and a maximum of 1,000 bbl, whereas gun-barrel tanks (oil-water separators) average 400 to 500 bbl and heater-treaters average 250 bbl.

Through discussions with the facility operators, it was found that the most frequent causes of spills were leaks in pipe or tube connections, pump and pumping unit seals, tank overflows, seepage through firewalls and from loading, gauging and transfer operations. Typically, these spills vary from a few gallons to approximately 50 bbl. For all of the facilities surveyed, there was no sign of pollution in any of the nearby waterways. Most of the noticeable pollution from spills was around or adjacent to the facilities themselves, and this was generally a result of minor leaks and poor housekeeping.

The major facility technical problems encountered during the survey were: poorly designed and constructed diking, lack of diking or other means of containment around the facility, poor housekeeping, insufficient facility maintenance and human error or carelessness in the operation of valves associated with the facility.

Description of the Survey Area

The basic soil in Area 1 is of the residual type, weathered in place primarily from sandstone and secondarily from shales. The terrain generally consists of plateaus and plains of moderate relief, which can be seen in Figure 2. This area varies from arid to semi-arid, with 15 to 20 inches annual rainfall. Most minor oil spills present no problem in this area since the oil/water mix would either rapidly evaporate or absorb into the sandy soil before reaching the nearest waterways which are few and widely scattered. Even a large spill generally would not reach a navigable stream. In such cases, the Federal regulation 40 CFR 112 requiring SPCC plans probably does not even apply. However, fresh water is very scarce in this primarily cattle-raising area and, therefore, extreme care is taken by both landowners and facility operators to protect all existing water supplies.

In Area 2 (Figure 1), the basic soil is alluvial (clay, silt, sand and gravel), both marine and continental deposits, which thicken toward the coast. Clay belts are also present in this region. The terrain in the area is essentially flat, with the exception of the northern area where it becomes slightly rolling with gentle rises. The area has considerable timber, but is used primarily for cattle grazing. Annual rainfall here varies from 30 to 40 inches at the northern end to 40 to 50 inches toward the southern end.

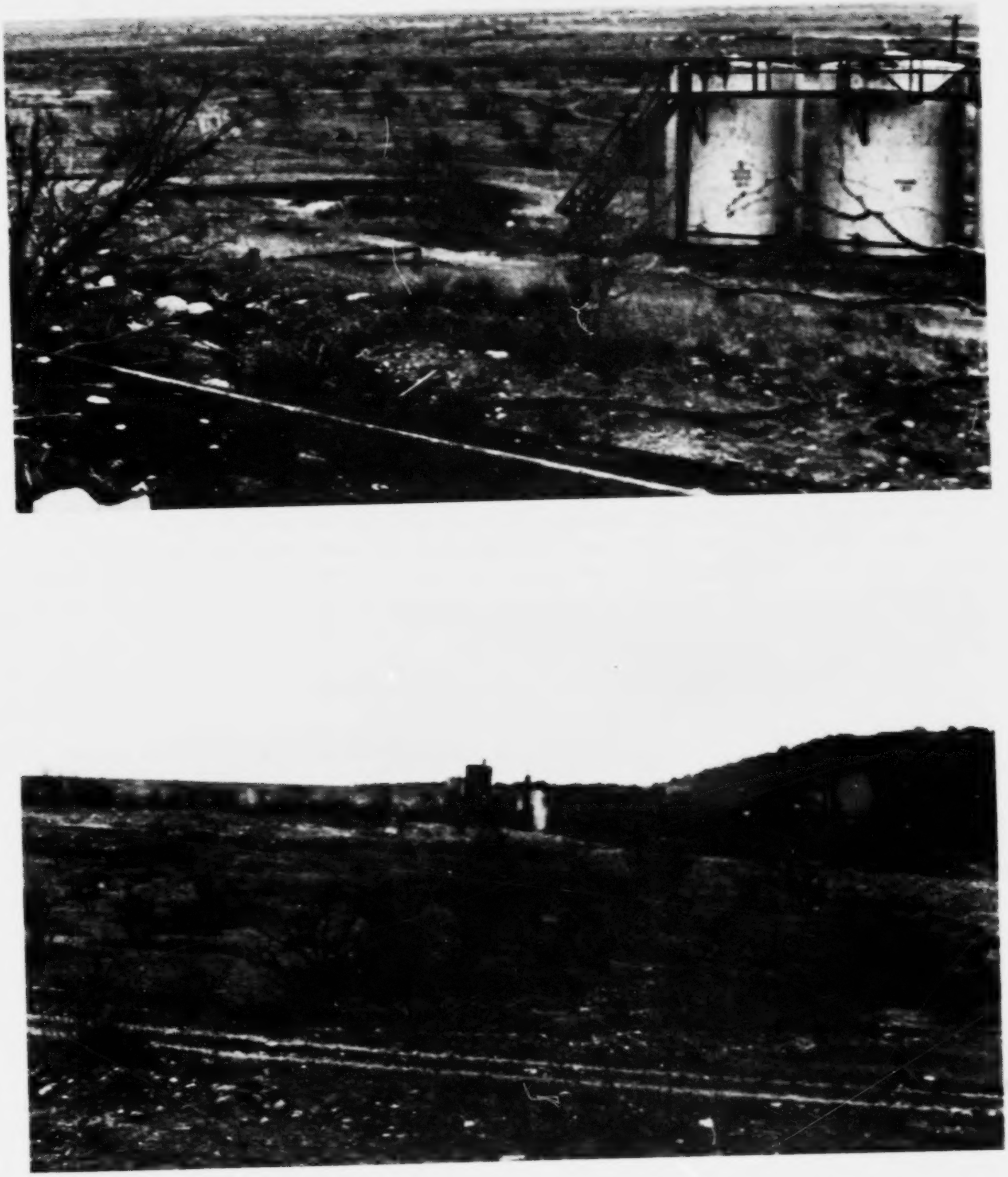


Figure 2. Typical terrain features of West Central Texas and Southeastern Oklahoma (Area 1).

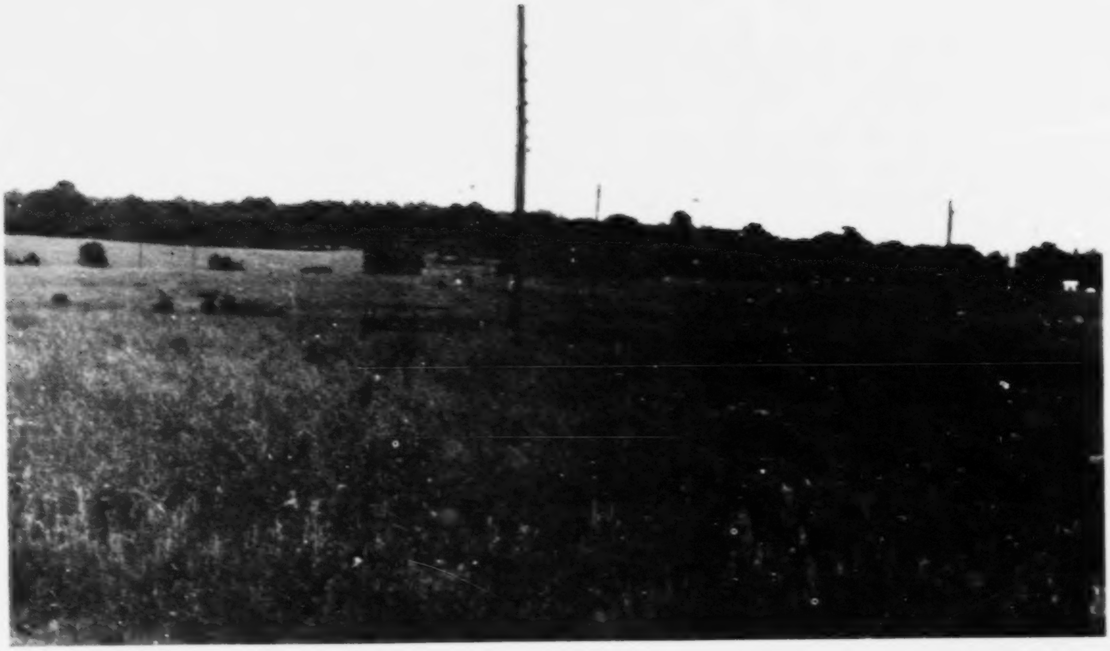
The threat of oil spills being carried to nearby navigable waters and standing water bodies is present. Typical views of this area can be seen in Figure 3. Four main rivers run through this region from north to south. Beginning in the east, the Sabine River runs along the Texas/Louisiana border; moving west, there are the Neches, Trinity and San Jacinto Rivers. Pollution problems resulting from a major spill are more likely here than in Area 1 (Figure 1) because of the proximity of these rivers and their tributaries.

The basic soil in Area 3 (Figure 1) is alluvial marine and continental deposits, with considerable organic material around the Houston area, changing to a more clay-like soil in the Corpus Christi area. The terrain in this region is completely flat as shown in Figure 4 and is used primarily for cattle grazing. Railfall in this area varies from 30 to 35 inches at Corpus Christi to 45 to 50 inches yearly in Beaumont. There is a threat of runoff water to transport spilled oil from the facilities to the nearby waterways. More importantly, however, this region is extremely sensitive to oil spills because of its location in relation to the Gulf of Mexico.

Description of Facilities

All of the stripper well production encountered in this survey area was accomplished through the use of pumping units (secondary recovery). These are old fields and as the field pressure declines, it becomes necessary to begin pumping relatively early in the life of the field. According to the operators, maintenance costs are high and small spills are frequent. In east Texas and along the Gulf Coast where the soils are predominantly sedimentary, settlement of the overburden, as natural field pressure decreases, tends to maintain an element of pressure on the field at all times. Thus, pumping is not required until late in the development of the field. Maintenance costs are generally lower and spills are less frequent. The product generally consists of crude oil with very small amounts of gas. Salt water production varies from practically nothing in the west Texas/Oklahoma area to as much as 99 percent in the east Texas and coastal regions. Well depths range from 500 feet in west Texas/Oklahoma to 3,000 feet in east Texas and to a depth of 7,500 feet along the Gulf Coast.

The basic stripper-well facility encountered throughout this survey is shown schematically in Figure 5. Its operation is as follows: a pumping unit is installed over production well A. The wellstream flows to the gun-barrel tank B which separates the oil from the salt water. The gun-barrel units are nothing more than large vertical tanks equipped with level-control valves. The salt water flows to tank C and then to the salt water pump F. From this point, the salt water can be loaded onto a truck for disposal or directed to a disposal well. The disposal well can either be an abandoned oil well or a new well prepared specifically for this purpose. From the gun-barrel tank B, the separated oil flows to the oil storage tanks D (always a minimum of two). These tanks are filled alternately and the oil delivered to the customer by either pipeline or truck. The trucks and the pipeline can be loaded by either gravity flow or by the use of pumps. When oil is removed from the facility tanks, it is the customer who gauges the tanks prior to and after removal. Before removing the oil from the tank, the



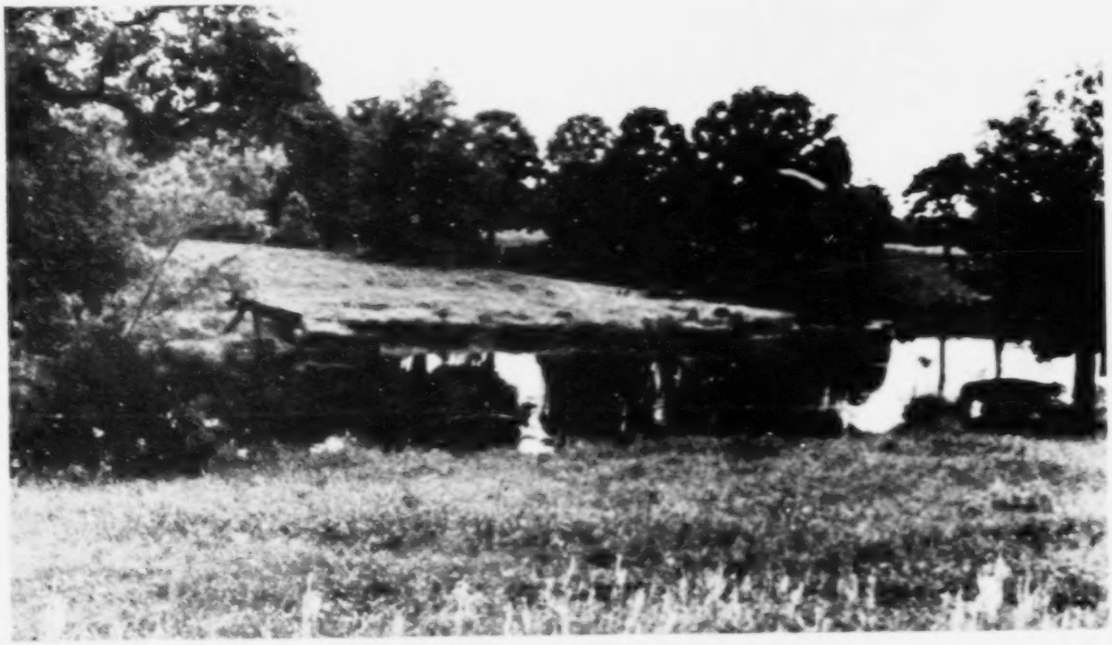


Figure 3 (a & b). Typical terrain features of East Central Texas (Area 2).

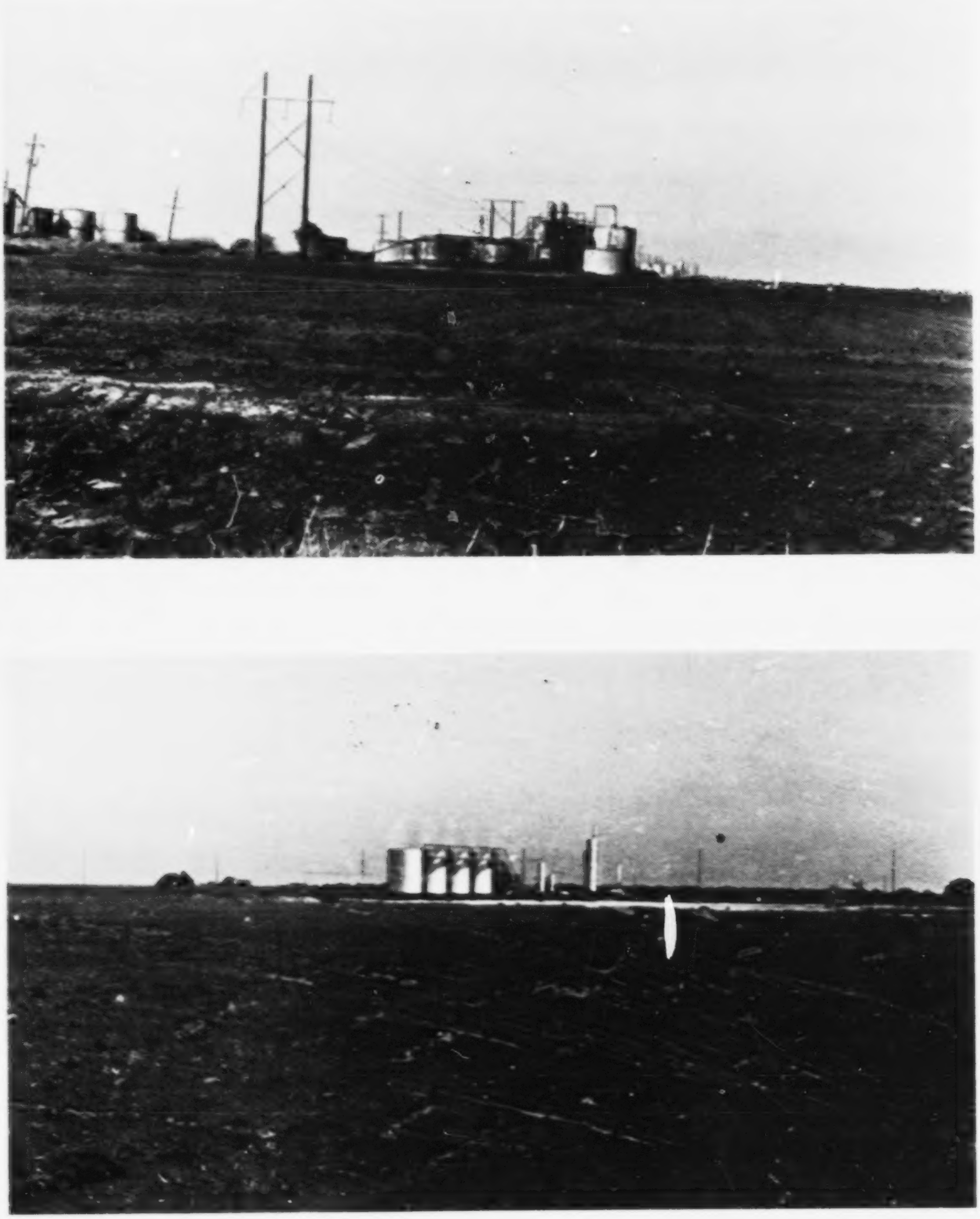


Figure 4 (a & b). Typical terrain features of the Southeast Texas coastal plains (Area 3).

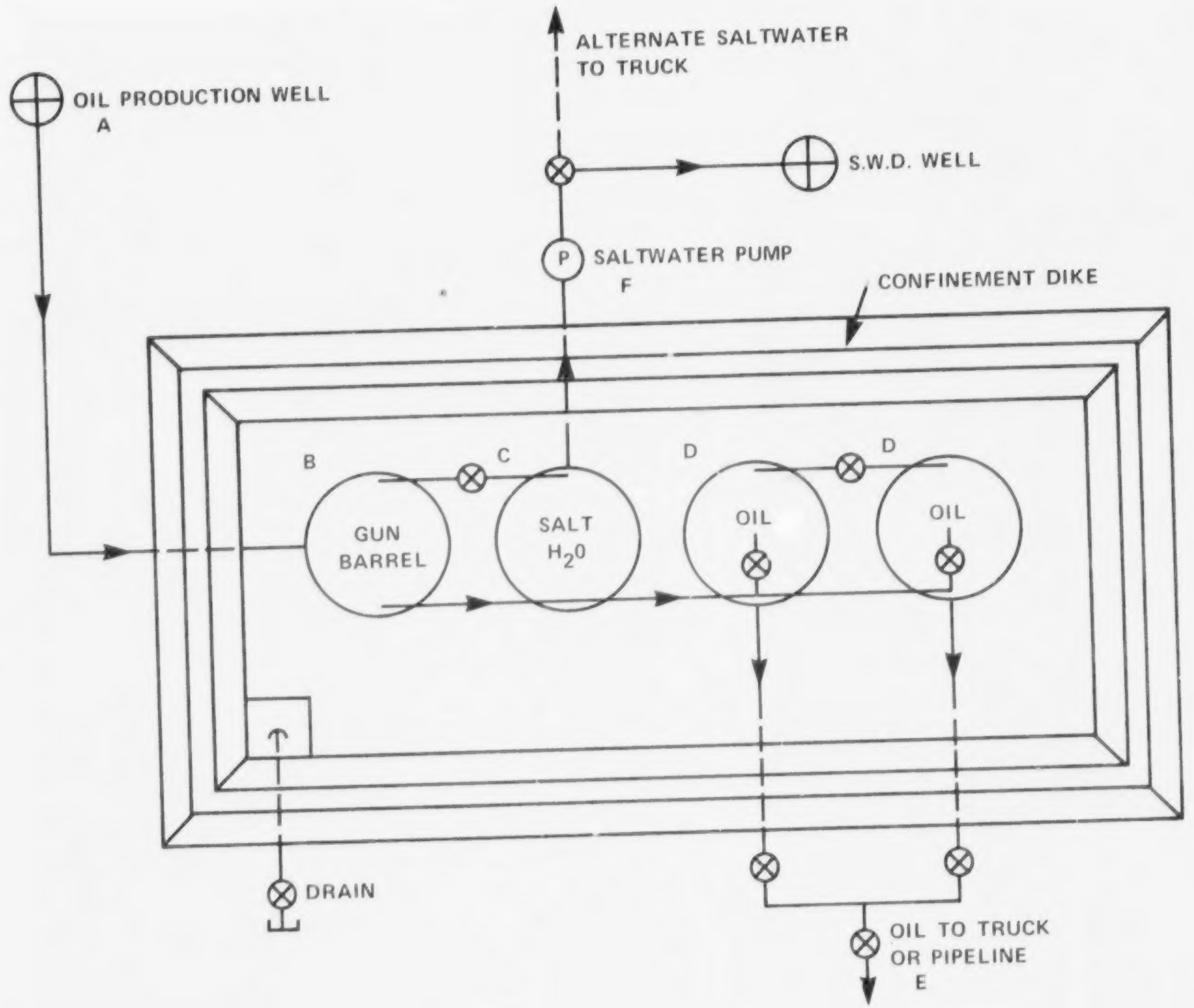

ALTERNATE SALTWATER TO TRUCK
OIL PRODUCTION WELL
A
S.W.D. WELL
P
SALTWATER PUMP
F
CONFINEMENT DIKE
B
C
D
D
GUN BARREL
SALT H_2O
OIL
OIL
DRAIN
OIL TO TRUCK OR PIPELINE
E

Figure 5. Typical stripper well facility in Texas and Oklahoma.

customer drains a small amount from the bottom of each tank to check the basic sediment and water (BS&W) content. The BS&W is normally drained to the ground inside the firewall, and is the primary cause of poor housekeeping, as typified by the scenes of Figure 6.

A gun-barrel tank is shown as the second vessel from the right in Figure 7. This vessel separates oil from water by gravity, the oil rising to the top and the salt water (white line) coming from the bottom of the tank. The elevation of the delivery line to the salt water tank (adjacent to the gun-barrel) is set so that the salt water in the line is balanced by the height of the salt water and oil in the gun-barrel. The oil is delivered to the two tanks on the left side of Figure 7 via the black line just above the gun-barrel. To the extreme right (Figure 7), outside of the firewall is a heater-treater (not being used in this facility). A heater-treater also serves to separate the oil from the water; however, the mixture is heated to aid the separation of the oil from the oil-water emulsion. Since the heat is supplied by burning gas and the flame is open to the outside, the heater-treater must be placed sufficiently far from the oil storage tanks and always outside of the firewall.

The two oil storage tanks shown in Figure 7 are inter-connected at the top with a pipe and valve. The valve is normally open so that if one tank is overfilled, it will spill into the reserve tank. The valve is closed during the removal of oil by the customer to prevent pulling a vacuum on the second tank or mixing the contents of the two tanks. The improper operation of this valve is the cause of many spillovers, since the pumper normally visits these facilities once a day, and if the valve is left closed and there is a delay in his return, a spill occurs.

There are many variations of the basic facility described in Figure 5. Additional wells can be fed through the same facility by adding more storage tank volume and by varying the size of the gun-barrel or heater-treater. The physical features of the facility also vary according to the terrain; i.e., the storage tanks are normally located at a lower elevation than the well pump to reduce the pressure on the pump rod stuffing boxes. Wells may also be located a half-mile from the tank battery. Some of these variations are shown in the scenes depicted by Figure 8 (a-d).

Technical Problems Encountered

The most frequently encountered technical problems which may result in spills or tend to propagate them are discussed in the following paragraphs. In general, failure to implement adequate SPCC plans is the underlying deficiency at the root of most of the technical problems presented below:

1) Dikes and firewalls were underdesigned on capacity and lacking in good engineering practice, especially with regard to specification of construction materials, soil compaction and leak-proof liners (see Figures 8e, f, g, and h).

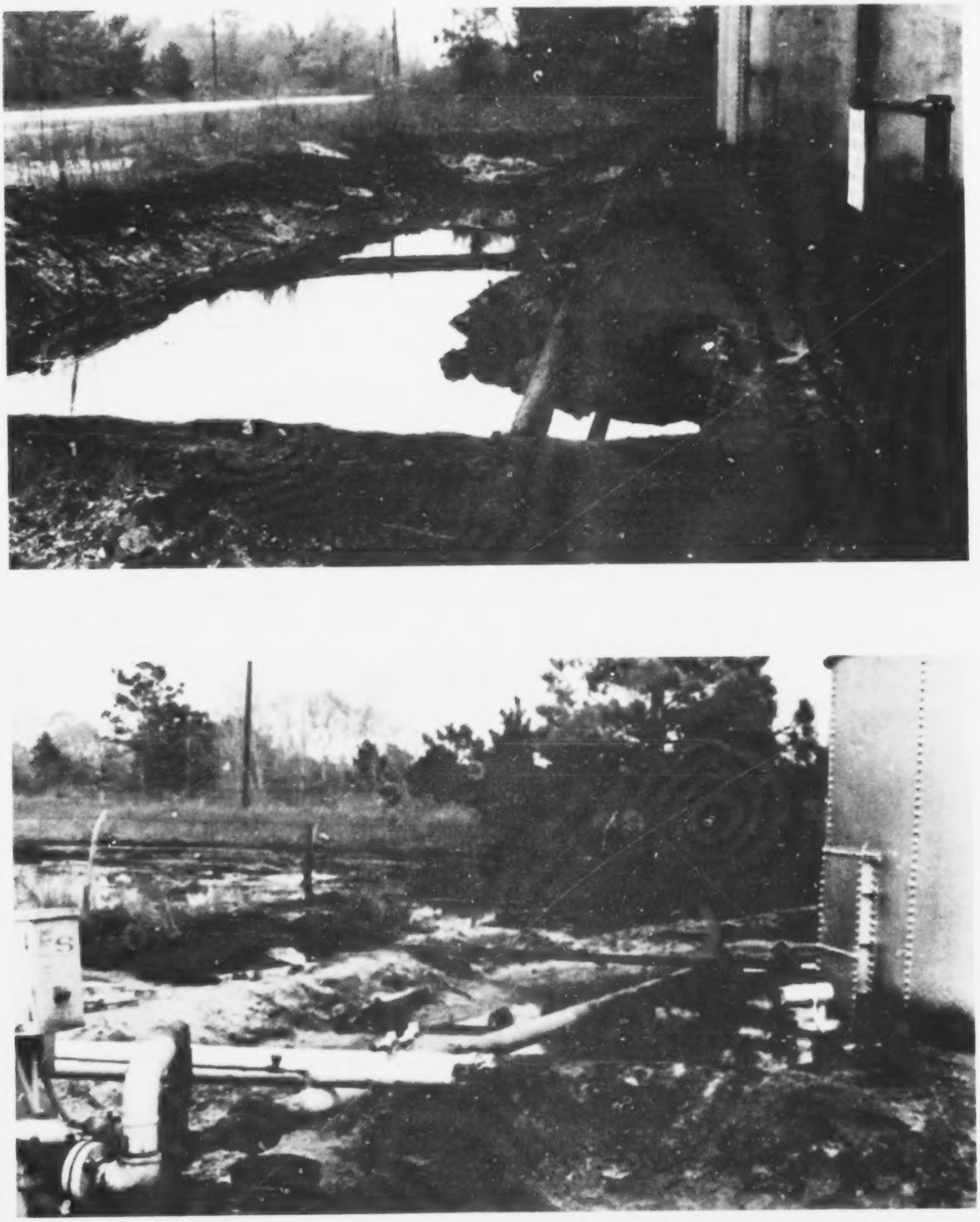


Figure 6 (a & b). Typical scenes indicating poor facility housekeeping -- Texas/Oklahoma area.

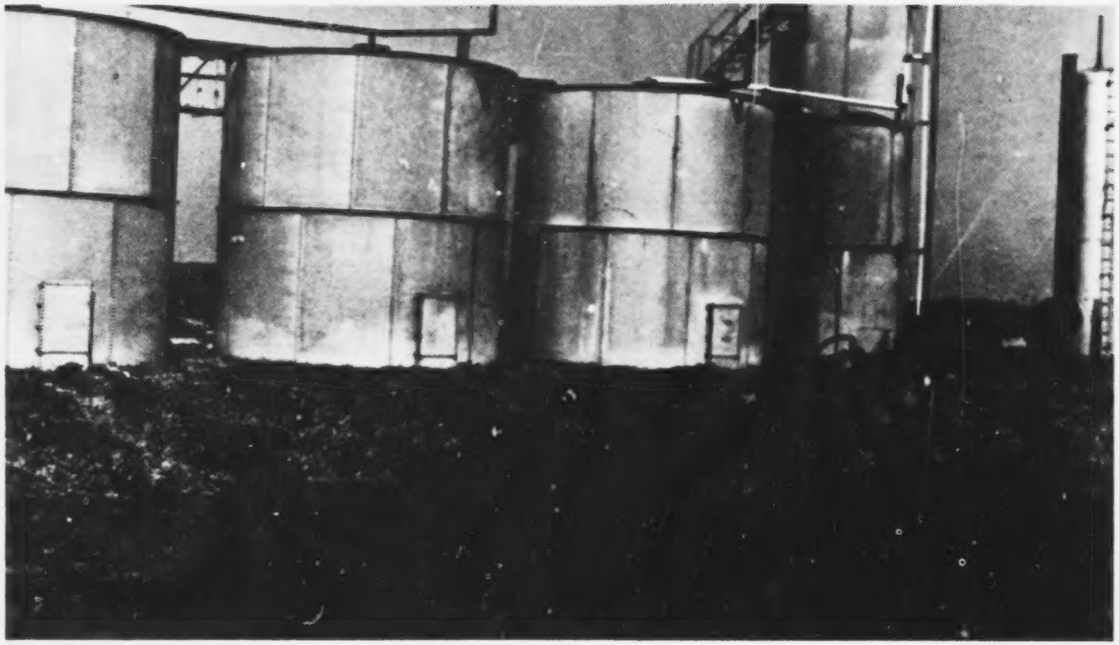
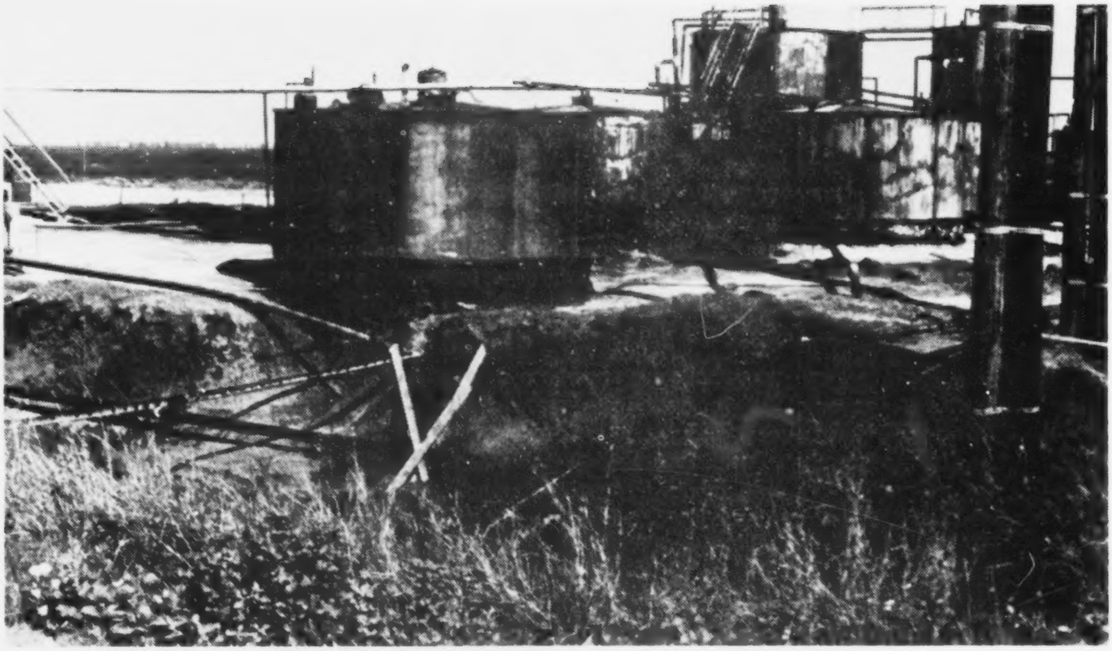


Figure 7. Typical Texas/Oklahoma stripper facility tankage arrangement.



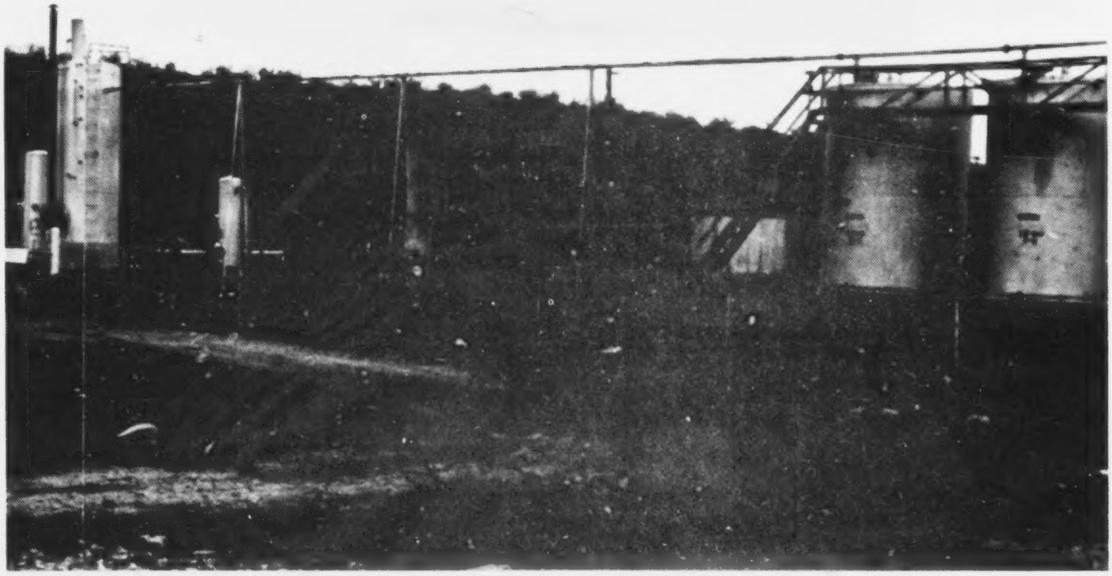


Figure 8 (a & b). Variations of the basic stripper well facility — Texas/Oklahoma area.

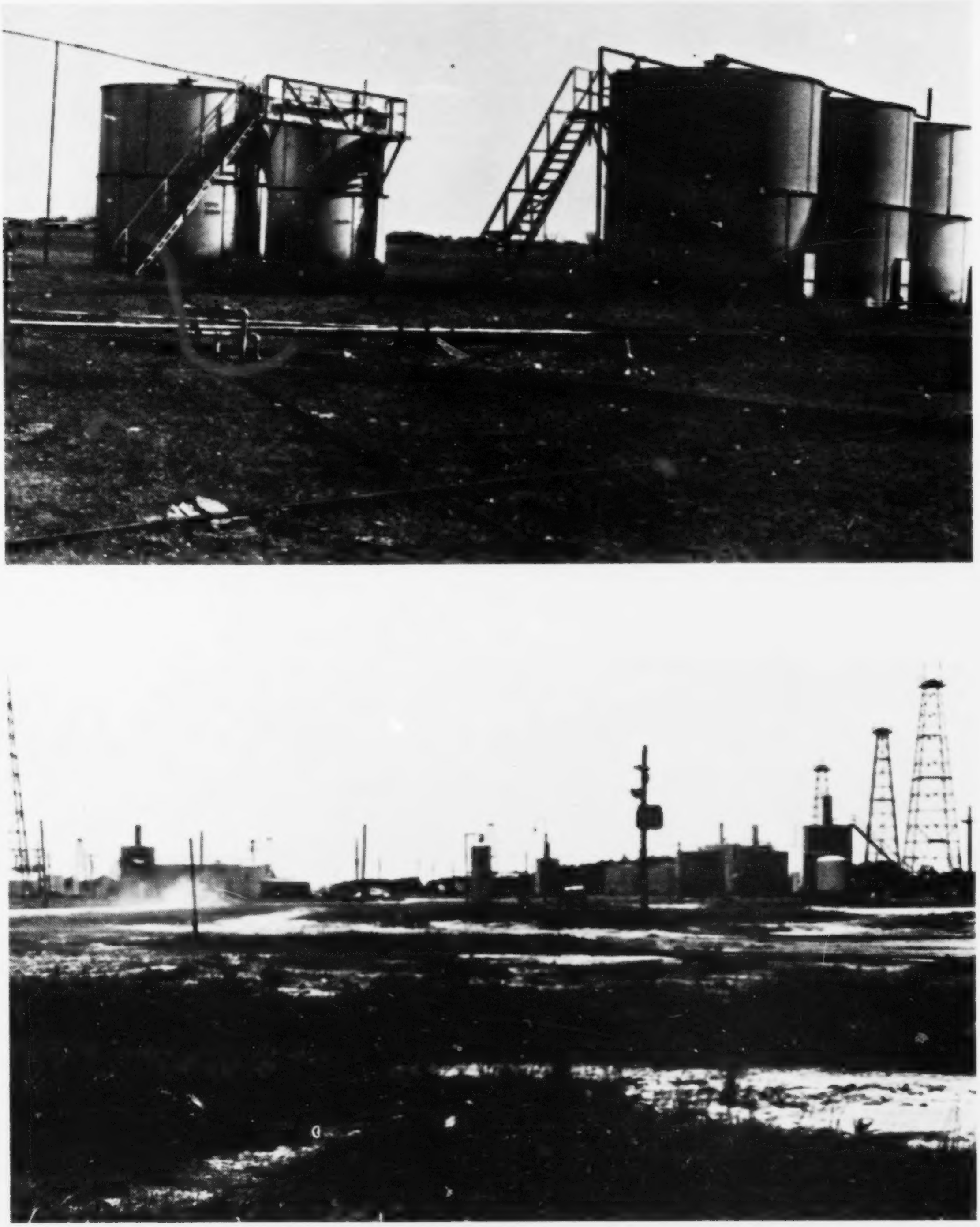


Figure 8 (c & d). Variations of the basic stripper well facility — Texas/Oklahoma area.

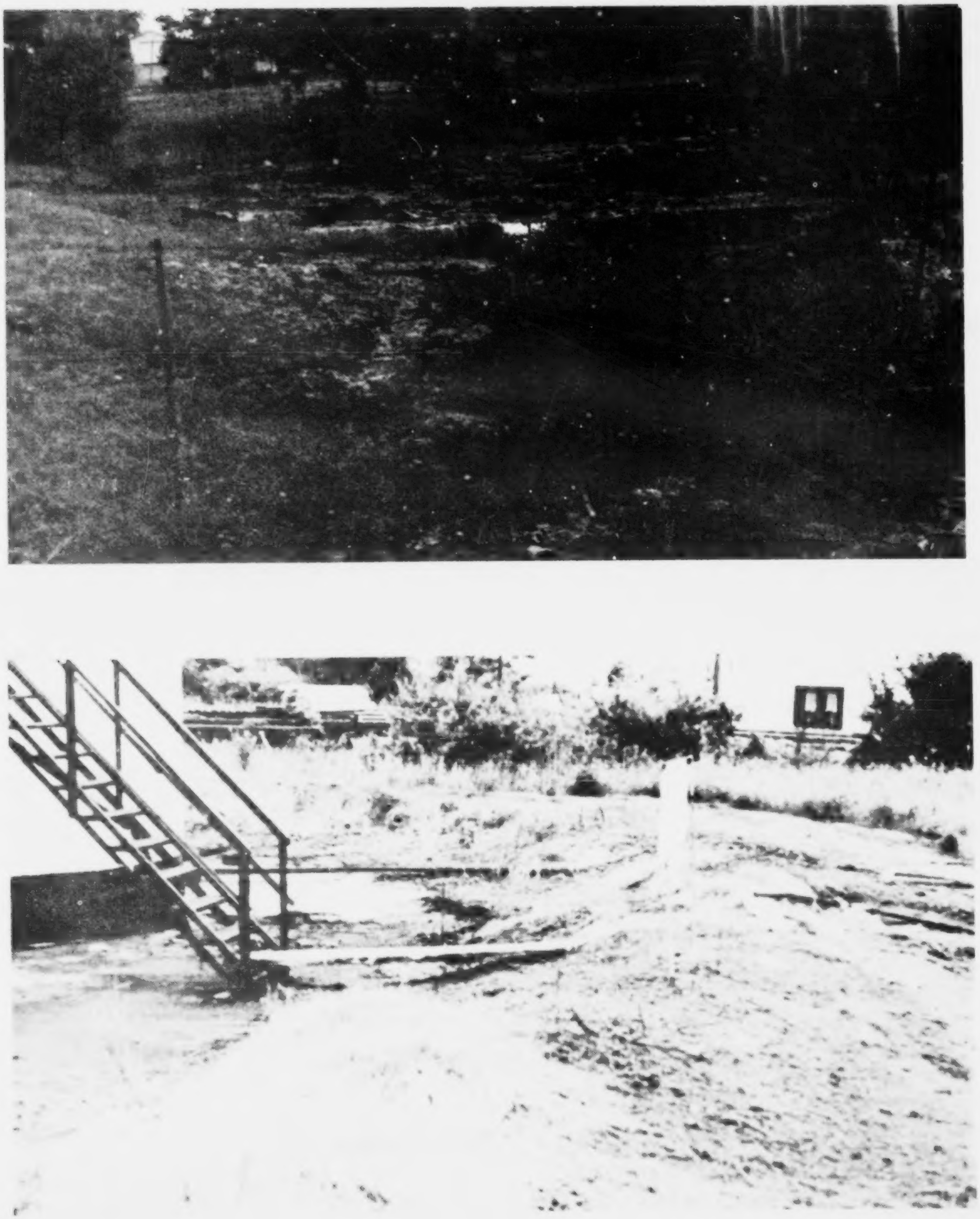


Figure 8 (e & f). Typical dikes and firewalls surrounding stripper well facilities — Texas/Oklahoma area.

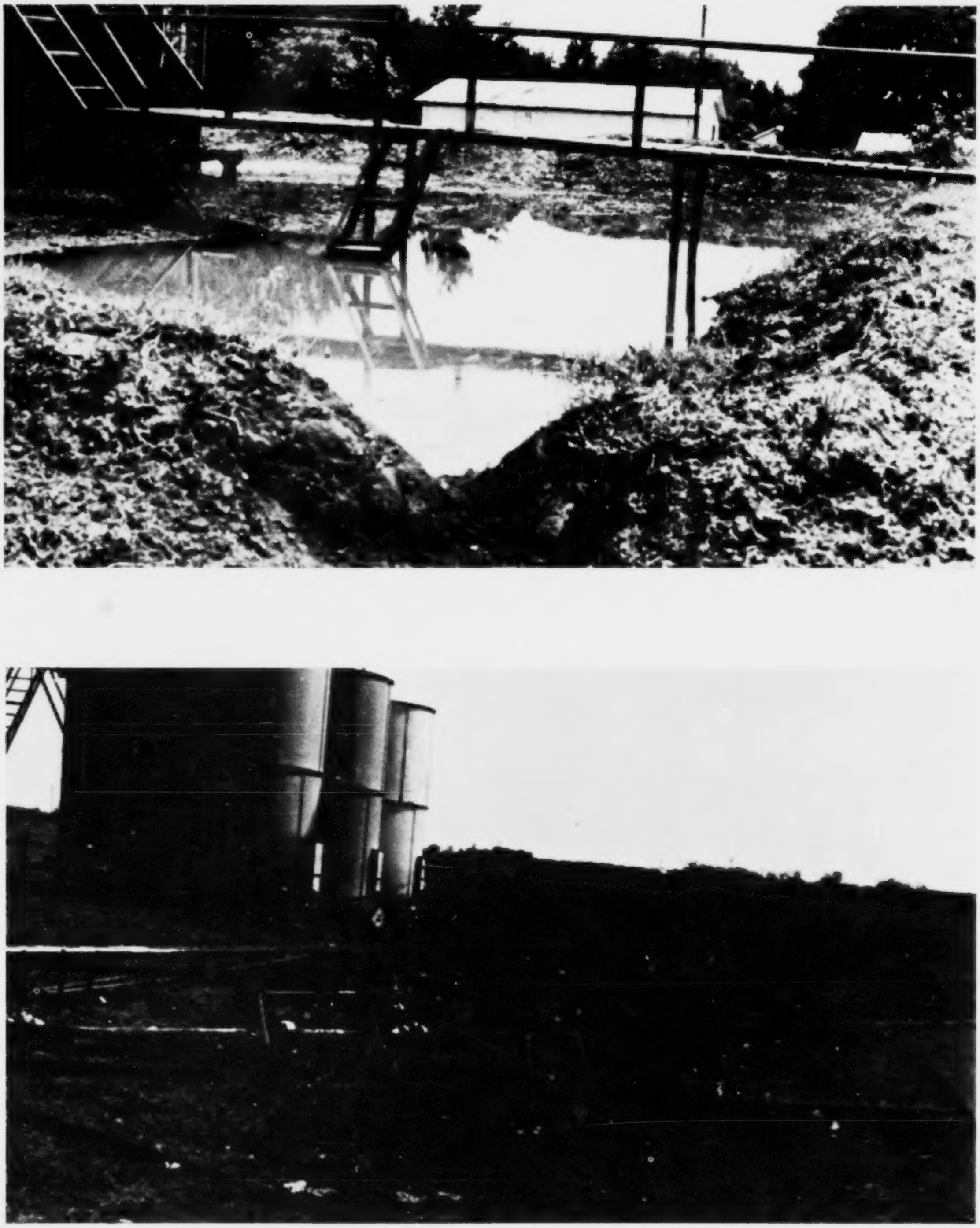
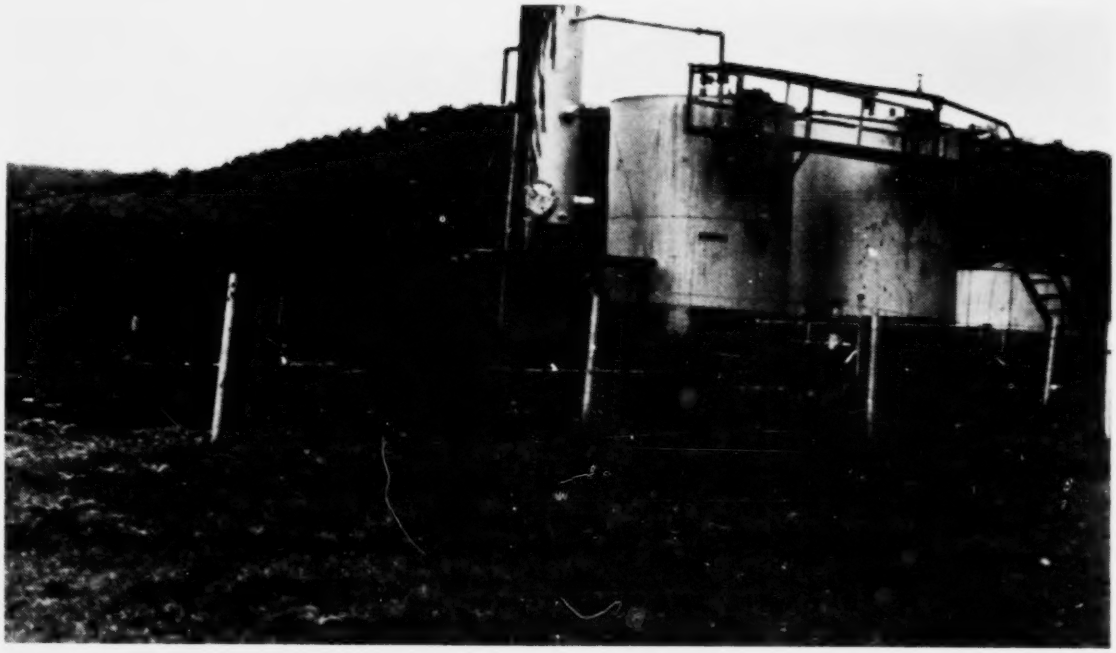


Figure 8 (g & h). Typical dike that has been breached (g) and unprotected area around storage tanks *(h)* for stripper well facilities — Texas/Oklahoma area.



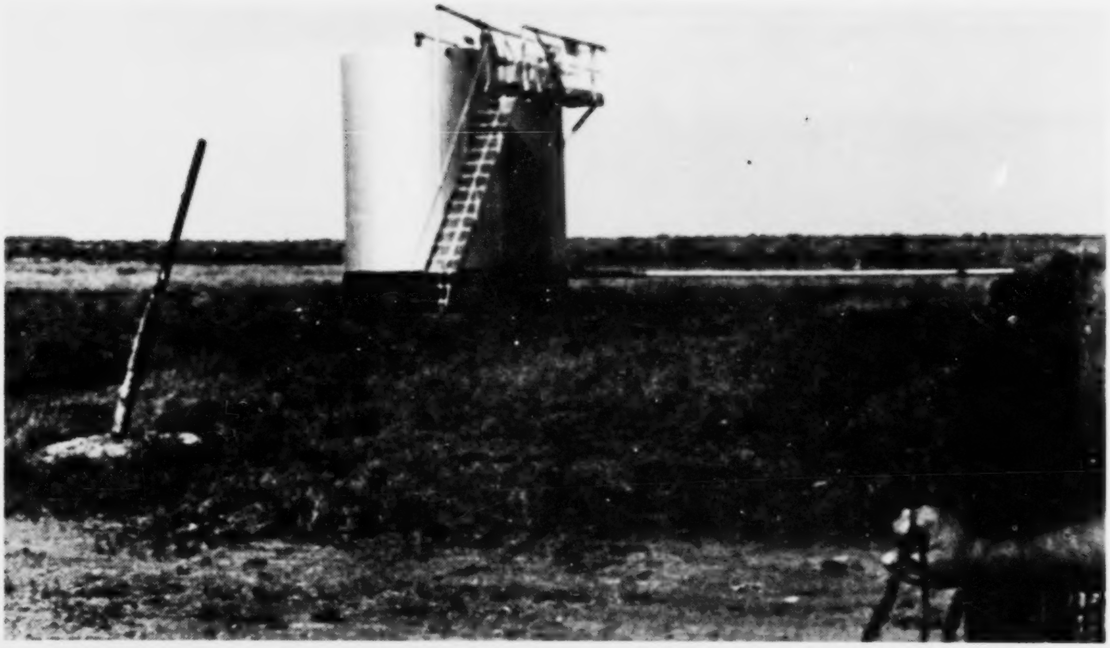


Figure 8 (i & j). Inadequate security fencing (i) and no security fencing (j) surrounding typical stripper well facilities - Texas/Oklahoma area.

2) Oil/water separators (gun-barrel type) are designed such that a simple malfunction of the level-control valve would cause considerable spillage of oil mixed in salt water (see Figure 8i).

3) Improper discharge, clean-up and disposal of BS&W, rainwater and tank overflows were noticed at the sites and existing SPCC plans failed to properly address this problem by specifying needed procedures and equipment (see Figures 8a and b).

4) Primarily because of fire hazards, pumps and heater-treaters are placed outside the firewalls. These types of equipment are usually undiked and, in addition to pipe connections, valves, pumping unit seals, pipe corrosion and transfer operations, are the predominant sources of minor spills (see Figure 7).

5) Operator errors and/or careless operations with respect to valves cause tank overflows and spills during tank gauging, BS&W drawdown and truck-loading transfer operations.

6) Spill detection and response time (12-hour minimum is normal) are difficult problems since most facilities are remotely located, largely unattended, and generally power lines are not available for remote sensor alarms.

7) Security fencing at these facilities is either lacking or inadequate, therefore, grazing cattle can enter the confines of the facility and destroy dikes and/or damage equipment (see Figures 8 i and j).

Solutions to Technical Problems

Recommended solutions to the technical problems described above are as follows:

1) The worst spill that can reasonable be expected is the rupture of a 1,000-bbl storage tank which may result in the release of the entire contents of the tank. Depending on the location and cause of the rupture, the tank contents may be released rapidly, in which case the dikes previously described may be breached due to the momentum of the flowing oil or released over a long period of time if the rupture is not too severe. In order to contain this maximum spill, any one of the three following procedures is recommended. In the first method, a secondary containment dike, a minimum of 1 foot high on level ground and at least 30 feet beyond the firewall (or, where there is no firewall, at least 50 feet from the tank) can be constructed. If the ground is slightly sloped, the dike could vary from nothing on one side to 1.5 to 2.0 feet at the low point. In the second method, a dam is constructed across the ditch below the facility (if this type of drainage exists) to the height necessary to hold back the oil. In crowded production areas, the dam could serve several facilities or an entire field. The third alternative

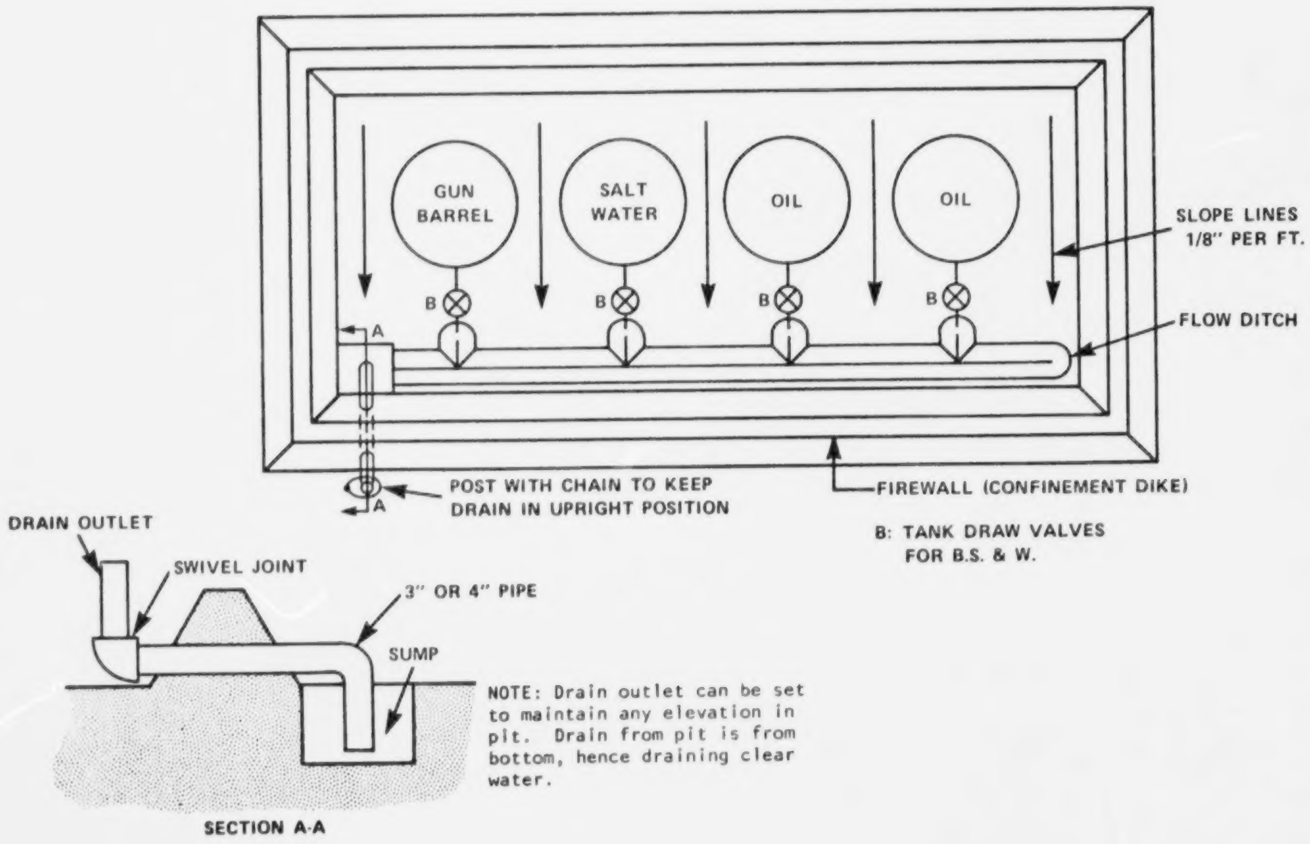
applies to an area where the terrain is favorable or there exists a natural depression to build a pit to which all spills and drainage can be conducted. In all three of the above procedures, some means of disposing of the spilled material must be employed. The disposal methods are the same as those that would apply within a firewall and are discussed in (3) below. All dikes, dams and firewalls should be designed for durability and the construction materials specified to retain the oil and salt water for 2-month periods without leaching. Compaction and shaping of this material should follow good engineering practice. Moreover, vegetation of some type should be grown on the structure in order to prevent its erosion. In addition, a fence should be installed at the perimeter of these structures in order to prevent their destruction by grazing cattle.

2) Contingency provisions for overflow from a gun-barrel type separator can be gained from the types of dikes and drainage discussed above. Perhaps the best approach would be a low-height secondary dike around the perimeter of the property. In any case, the containment provided should be sufficient to hold at least the quantity of oil-salt water mixture that would be pumped from the well during the longest period that the facility is expected to be unattended. In addition, the level-control valves themselves should be checked and maintained regularly for proper operation, i.e., to be certain that the mechanism does not corrode or otherwise fail.

3) The one way in which to keep the area within the firewall clean is to provide drainage to one corner and install a pipe and valve through the firewall for drainage. The collected material (rainwater, BS&W, etc.) can then be pumped out or allowed to flow by gravity. In addition to draining all fluids within the firewall to one corner, if a pipe or even a small open trench were cut to the low corner of the facility from the BS&W drawdown point, a cleaner operation would result. A schematic drawing of this drainage design is shown in Figure 9.

4) When replacing pump seals, valves, or while loading trucks or performing routine maintenance, the use of buckets or drip pans is an inexpensive method of keeping the area around the facility clean. An alternative method is to maintain sorbent materials at the facility and to clean up the area as soon as the work has been completed.

5) Operator errors and carelessness can be overcome with regular training sessions, written procedures for operations and maintenance, and checklists that must be completed, signed and filed.


GUN BARREL
SALT WATER
OIL
OIL
B
B
B
B
SLOPE LINES 1/8" PER FT.
FLOW DITCH
A
A
POST WITH CHAIN TO KEEP DRAIN IN UPRIGHT POSITION
FIREWALL (CONFINEMENT DIKE)
B: TANK DRAW VALVES FOR B.S. & W.
DRAIN OUTLET
SWIVEL JOINT
3" OR 4" PIPE
SUMP
SECTION A-A

NOTE: Drain outlet can be set to maintain any elevation in pit. Drain from pit is from bottom, hence draining clear water.

Figure 9. Suggested drainage from firewall.

Discussion of Existing SPCC Plans

Most of the existing SPCC plans reviewed during the survey follow the API format but fail to incorporate the engineering thinking, design and specification required to formulate a good plan. A number of other plans reviewed were simply statements to the effect that due to the location of the facility with respect to a waterway, no further action on the owner/operator's part is required, which is valid for some cases. The latter plans were found to predominate in the west Texas/Oklahoma areas where rivers and streams are very scarce.

There is little evidence of SPCC plan implementation other than slightly improved housekeeping and some hastily constructed firewalls.

A typical example of a completed API-SPCC plan from the Texas/Oklahoma area is presented in Appendix B. After having reviewed a number of these completed API-SPCC plans, there are several pertinent comments concerning the information contained therein. Referring to the SPCC plan in Appendix B, the following comments are made:

Part I

Page 1 of 3 - None of the plans indicated a reportable spill in the 12 months prior to January 1, 1974. This is not surprising for Area 1, but is almost unbelievable for Areas 2 and 3. A reported spill would require a written description, corrective action taken and plans for preventing reoccurrence.

Page 2 of 3 - An SPCC plan with this page attached was not seen. This is the heart of the whole form for determining the adequacy of the plan. If properly filled out with all spill sources listed and with a sketch of the facility made mandatory, a good picture of the pollution hazard of the facility would be presented.

Page 3 of 3 - The answer to question 8 was always "yes," therefore, indicating that it was practical to prevent oil from reaching the navigable waters: Questions 9 and 10 are always answered "yes" and the supporting discussion is usually similar to that shown. However, question 9B was not usually answered, indicating that written procedures did not exist.

Part II -- Alternate B

Questions in this section are fairly well answered, with the exception of A-2. Most answers to this question refer back to A-1, which covers diked storage areas; however, very little secondary containment has been noted anywhere. Attachment No. 3 is filled out but, from the time of plan preparation, no further records are kept.

In conclusion, it is felt that the API-SPCC plan format was used to merely satisfy the preparation of a SPCC plan which is required by 40 CFR Part 112. However, the guidelines for preparation given in 40 CFR 112.7 were generally not satisfied even though they were supposedly reviewed and certified by a registered professional engineer. Therefore, a new plan has been prepared which satisfies the guidelines and requires more engineering thought rather than yes and no answers to a prescribed set of questions.

Recommended SPCC Plan

Many of the facilities surveyed in the Texas/Oklahoma area are similarly constructed and have experienced essentially the same technical problems with regard to oil spills. Therefore, a generic SPCC plan, with options, has been prepared for the entire Texas/Oklahoma area. This plan is presented in Appendix E and a brief description of its content is presented below.

The cover sheet for the plan is basically the same as that employed by API. On the second sheet, under item C — Description of Facility, are listed seven items which give all the pertinent information concerning the physical characteristics of the facility. It is believed that the inclusion of a sketch of the facility is a very important item. The work required in preparing D — Description of Operation, will force the plan's preparer to think carefully about how this particular facility functions. Under item E is a list of equipment or methods of operation designed to prevent oil spills. The seven listed items are all covered by the API format; however, in this plan, "yes" and "no" type answers cannot be used and the plan preparer must again think about how the facility is to be operated.

Conclusions: Texas/Oklahoma Area

The following conclusions are based on conversations, observations and data collected during this survey:

1) Throughout this survey, no signs of pollution of navigable streams (as defined in 40 CFR Part 112.2) or adjoining shorelines were observed. Minor leaks or spills were generally confined to the immediate vicinity of the stripper-well facility and usually resulted from pipe connections, valves, pump seals, maintenance and transfer operations and poor housekeeping.

2) At very little additional cost to the operator, housekeeping and maintenance around these facilities can be improved and improvement in both is needed.

3) Joint land use areas, i.e., oil production and either farming or cattle grazing, have tended to ensure that these production facilities do not pollute the surrounding environment, except that fencing is not always provided around the facilities to prevent grazing cattle from damaging the equipment. The reason for this extra care is that the oil producer is liable for any resulting damage.

4) Secondary containment by low dikes or dams, as discussed earlier, is the most economical solution to pollution prevention for the on-shore production facilities surveyed, but is not often employed.

5) The use of remote control, visual or audio alarms, automatic operations and fail-safe systems is not feasible for the stripper operations surveyed because of their prohibitive costs and facilities being largely unattended and in remote locations.

6) The cost of SPCC plan preparation (similar to that shown in Appendix B) by a registered PE is approximately $200 in the area surveyed and probably requires 4 to 8 hours preparation time.

7) The cost involved in implementing the generic SPCC plan (presented in Appendix E) would depend upon the size of the facility. However, it is estimated that this cost would range between $1,000 and $2,500 for the majority of facilities surveyed (based on 1974 typical costs — see Appendix A).

LOUISIANA AREA

Introduction and Summary

The objectives of this portion of the study were to survey representative samples of both the water-based and on-shore oil production industry in Louisiana, with emphasis on the Louisiana State waters area, for the purpose of determining the technical problems these facilities are experiencing in complying with 40 CFR Part 112, and to recommend a number of alternative solutions to these problems. These solutions are in the form of generic SPCC plans for the various categories of facilities identified during the survey, which can be implemented by the majority of production facility owners/operators at reasonable costs, yet provide adequate protection to the environment. The generic SPCC plans are given in Appendix F.

The Louisiana survey was divided into five geographical areas which are included in the region south of highway I-10 and bordered by the Texas state line on the west and by the Mississippi River on the east. These areas are shown on the map in Figure 10 and are described below:

- Area 1 — The Atchafalaya Basin or Spillway is a fresh water area which can only be reached by boat since there are no roads. This area serves as a floodway to take the excess water from the Mississippi River and deposit it in the Gulf of Mexico. The Spillway starts at Morganza, on the north, and extends south about 75 miles to Morgan City. The Atchafalaya River Valley forms the boundaries of the Spillway on the east and west. The width of the

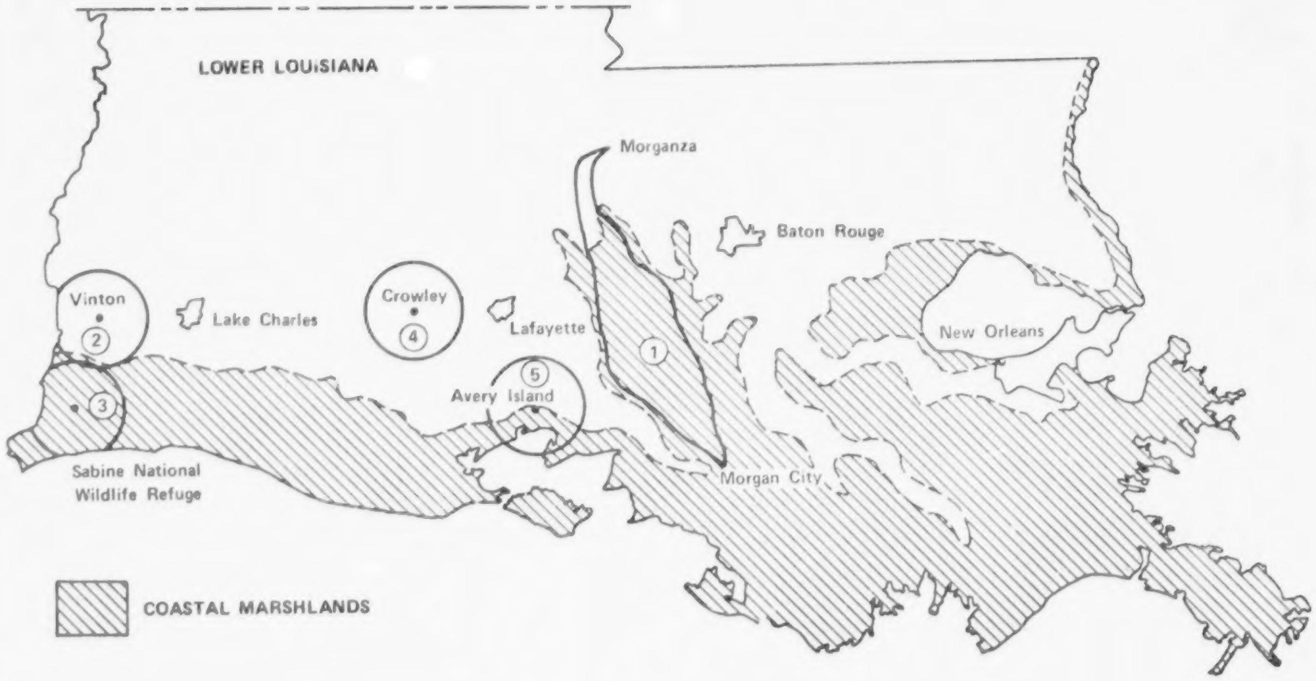
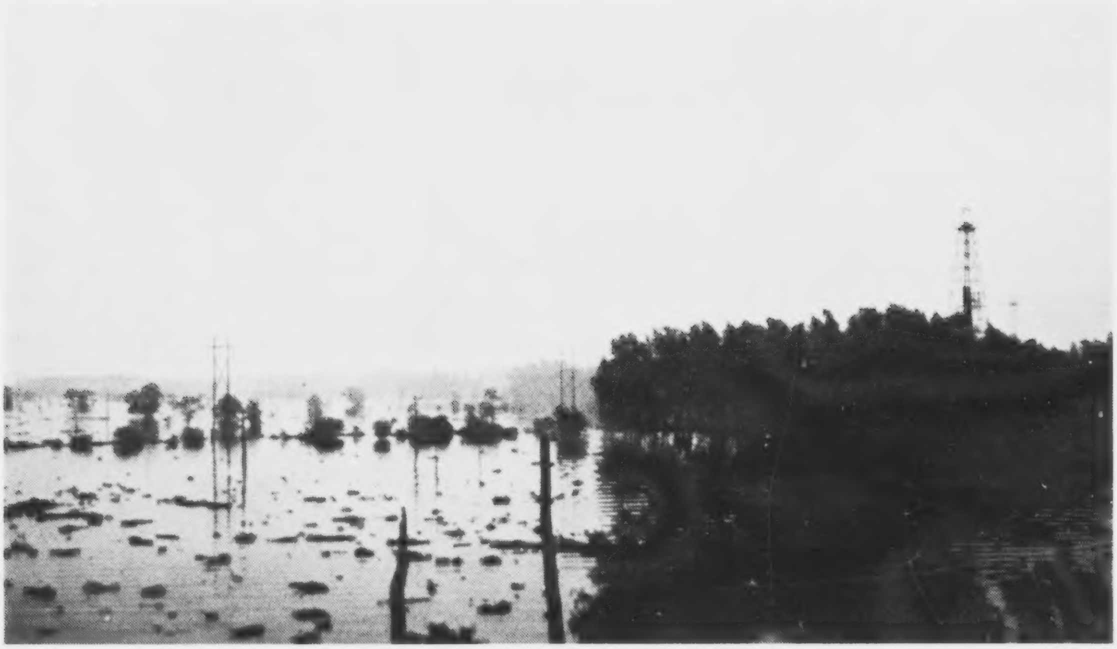

LOWER LOUISIANA
Morganza
Baton Rouge
Vinton
②
Lake Charles
Crowley
④
Lafayette
①
New Orleans
⑤
Avery Island
③
Sabine National
Wildlife Refuge
Morgan City
▨ COASTAL MARSHLANDS

Figure 10. Geographic areas of Louisiana covered by the survey.

Spillway averages about 15 to 16 miles, with the widest point being 23 miles. The survey covered the central section of the Spillway where the average water level is 2.2 feet and the land elevation is 5 to 6 feet on the average, with occasional small rises to 8 or 9 feet. When the floodway is open, the water level rises to 14 or 18 feet, which necessitates the termination of all oil production activities in this region. During the survey, the water level was receding from a high level and averaged about 4.5 feet. The Spillway area is a complicated maze of bayous and dredged canals and required an experienced guide to locate the problem oil production facilities of interest in the survey (8 installations were visited). The photographs in Figure 11 are representative of the characteristics of this particular area.

- Area 2 — This is the Vinton field, which is just south of Vinton, Louisiana. Two oil production facilities were surveyed in detail in this primarily agricultural (rice growing) area. Figure 12 is typical of the terrain in this region.
- Area 3 — This area is approached from Johnsons Bayou on the coast and is in the vicinity of the Sabine National Wildlife Refuge. Marshlands predominate here and access to this region is primarily by boat. Two facilities were surveyed in detail in this area. Figure 13 is representative of the terrain encountered in that area.
- Area 4 — Figure 14 is typical of this primarily inland agricultural area which is known as the Crowley field. Two facilities in this region were surveyed in detail.
- Area 5 — This area is in the vicinity of Avery Island and includes the coastal marshlands. Figure 15 is representative of the terrain features encountered there. Only one facility was surveyed in detail in this area.

The water-based production facilities in the Louisiana coastal areas normally produce gas and oil. Most of the oil is a condensate, having a fairly low specific gravity. Salt water production ranges from practically nothing to as high as 70 to 80 percent of the flow from the well. Most of the wells in this region are rated as gas producing, which by definition means that the production of gas is greater than or equal to 15,000 cubic feet of gas per 1 barrel of oil. However, there are a number of wells which produce oil as the primary product. Oil production per well ranges from a low of about 40 to a high of about 350 bbl a day for most of the wells surveyed. The facilities visited in this area are a very special type, primarily due to their physical location, and are probably not duplicated anywhere else in the United States.



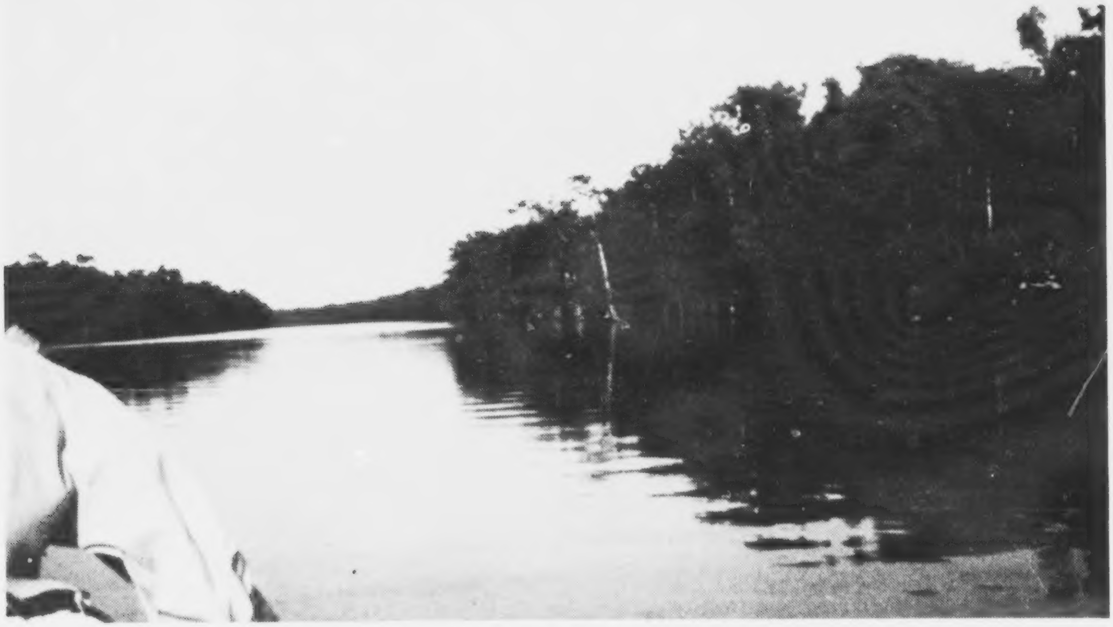


Figure 11 (a & b). Typical terrain featurer in Louisana Area 1 — the Mississippi area.

Figure 11 (c). Typical terrain features in Louisana Area 1 — the Mississippi Spillway

Figure 12. Typical terrain features in Louisiana Area 2 — the Vinton Field.

Figure 13. Typical terrain features in Louisiana Area 3 — Sabin National Wildlife Refuge vicinity.

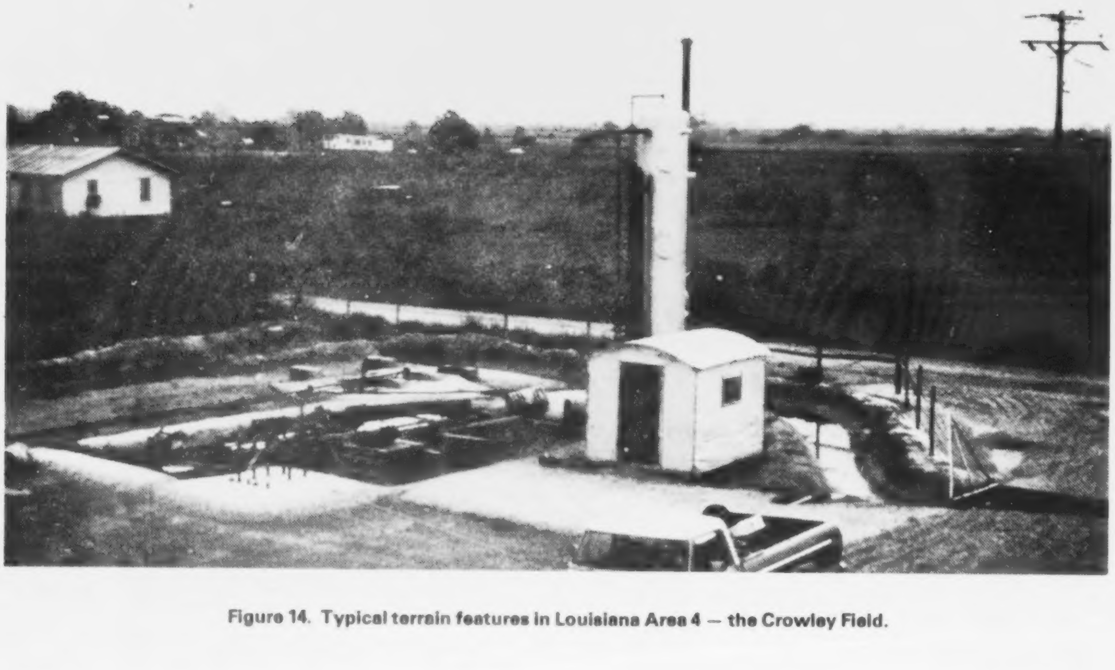


Figure 14. Typical terrain features in Louisiana Area 4 — the Crowley Field.

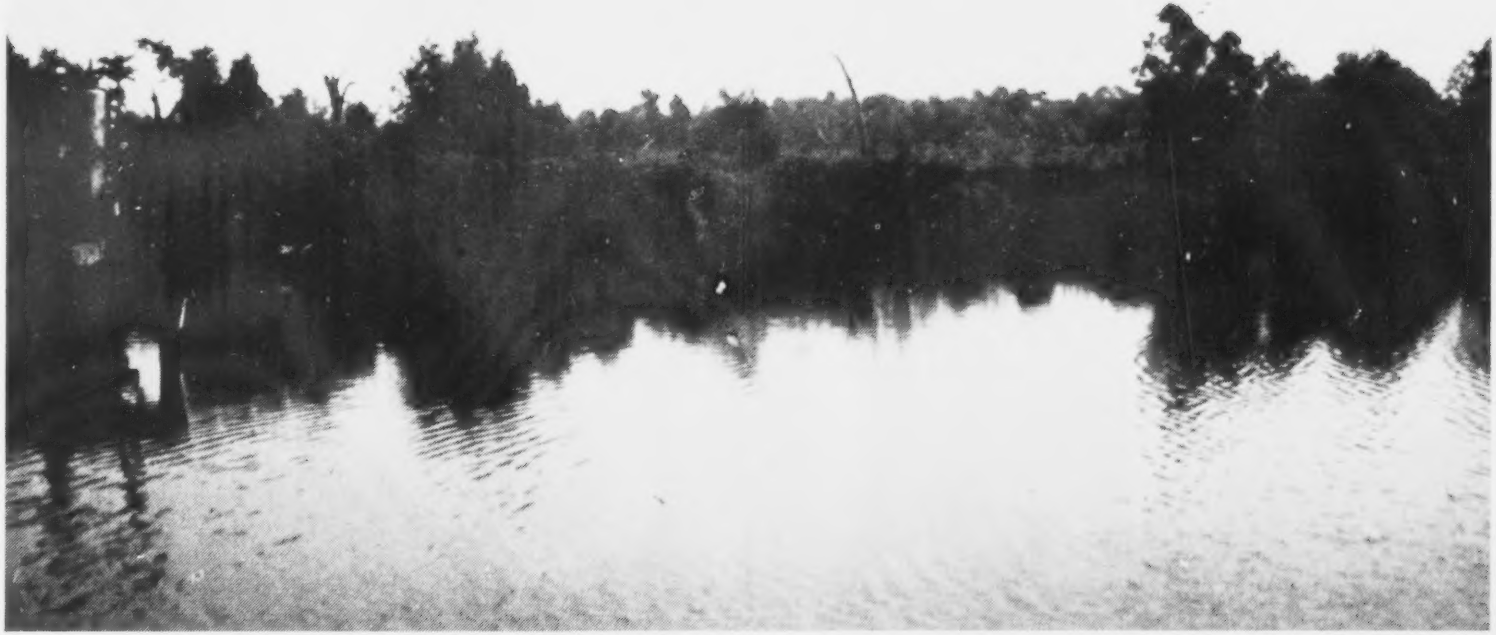


Figure 15. Typical terrain features in Louisana Area 5 — Avery Island vicinity.

Most of the SPCC plans for the Louisiana water-based facilities were unavailable since the facilities themselves are in remote locations and usually are unmanned most of the time. These plans are kept primarily in district offices which are located 40 to 60 miles from the facility itself. The plans that were reviewed followed the API format. They did not reflect engineering thought in their preparation. The pumpers who service these facilities were, in general, not familiar with the plans but knew of their existence. Statements in the plans regarding inspection, training and record keeping are minimal and lead one to believe that they are not being implemented.

Although no signs of oil pollution were observed in the water during the survey, the remains of previous oil discharges were evident on many of the adjoining shorelines. While this evidence might have been indicative of actual spill events from individual facilities, it may have been symbolic of a greater oil discharge problem that is always present in the Mississippi Spillway. This greater problem relates directly to the functioning of the Spillway itself. It was indicated earlier that when the Spillway is flooded, the water level can rise 9 to 13 feet above the land elevation. When this high water occurs, the land on which storage tanks, oil-water separators and collection pits are situated will be flooded, very likely above the tops of firewalls and dikes at the facilities. Any oil or oily wastes around the facility's equipment, even inside the firewalls and dikes, will be washed away. It has also been noted that, at the time of the survey, the water level was receding from a high level and was still 2 to 3 feet above the normal level.

The problems encountered with the on-shore facilities in the rice growing region of Areas 2 and 4 can easily be overcome. The application of the secondary containment procedures as applied to the Texas/Oklahoma area would be quite adequate. However, the problems become quite difficult in Areas 1, 3 and 5 where most of the facilities are either in the water or directly on the adjoining shoreline. Preventive measures and a strong countermeasure plan appear to be the only solution for the off-shore wells whereas a combination control and countermeasure solution would be applicable to the facilities on the adjoining shorelines.

Description of the Survey Area

The terrain in the Louisiana survey region is completely level and the soil consists of alluvial deposits ranging from 3,000 to 8,000 feet in depth over the various oil-producing sands. At the surface, the soil is a very wet sticky gumbo which is difficult to handle. Dikes and pits constructed of this surface material are highly undesirable since they wash away easily in heavy rains. Typical structures composed of this material, and which are common to the survey area, are shown in Figure 16.

The vegetation encountered in the areas farther from the coast is agricultural, consisting primarily of rice, sugar cane and soy beans. Land in this area not being used for agricultural purposes supports various grasses and some trees. The terrain closer to the coastal areas is composed primarily of marshes and swamps and contains water lilies, marsh grass and cypress forests.

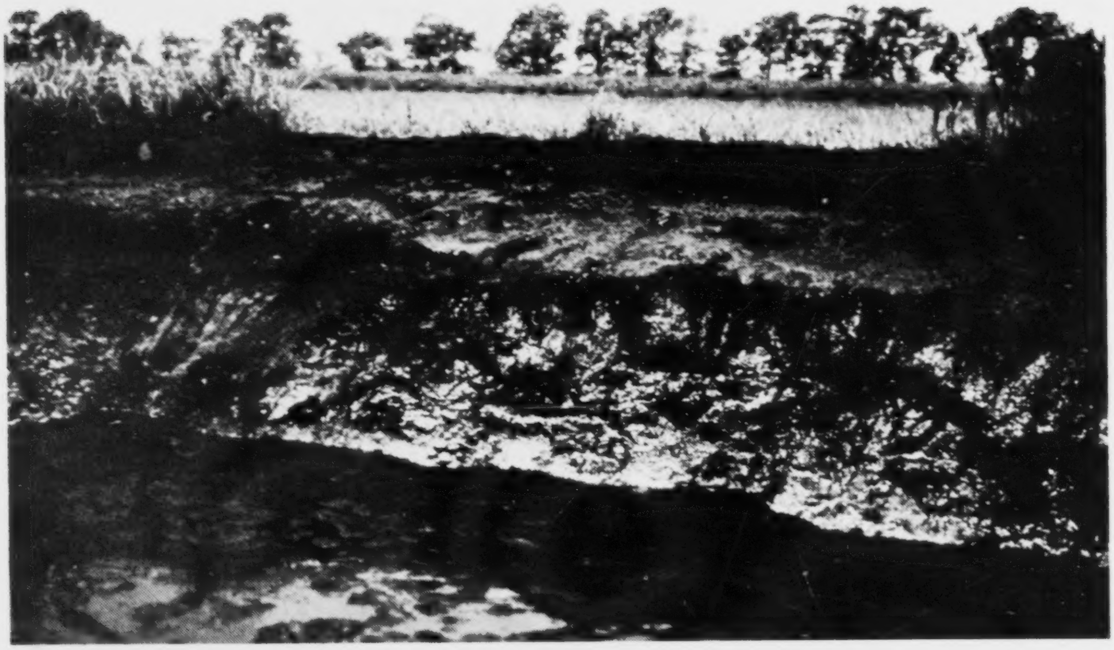


Figure 16 (a & b). Typical containment structures built from surface soil in the Louisiana water areas.

The climate in this region is sub-tropical and the average annual rainfall is between 56 and 66 inches. The evaporation rate is relatively low in this area and therefore cannot be relied upon for disposing of the salt water contained in open pits around many of the facilities.

Description of Facilities

Practically all of the production in this area is obtained from flowing wells; only one pumping well facility was observed during the entire survey. The product obtained from this area consists primarily of gas and the oil is largely a condensate rather than the heavy dark crude oil. Salt water production in the area varies from practically nothing to as much as 70 to 80 percent of the flow from the well. The well depth in the region varies from 3,000 to 8,000 feet, with multiple overlying oil sands.

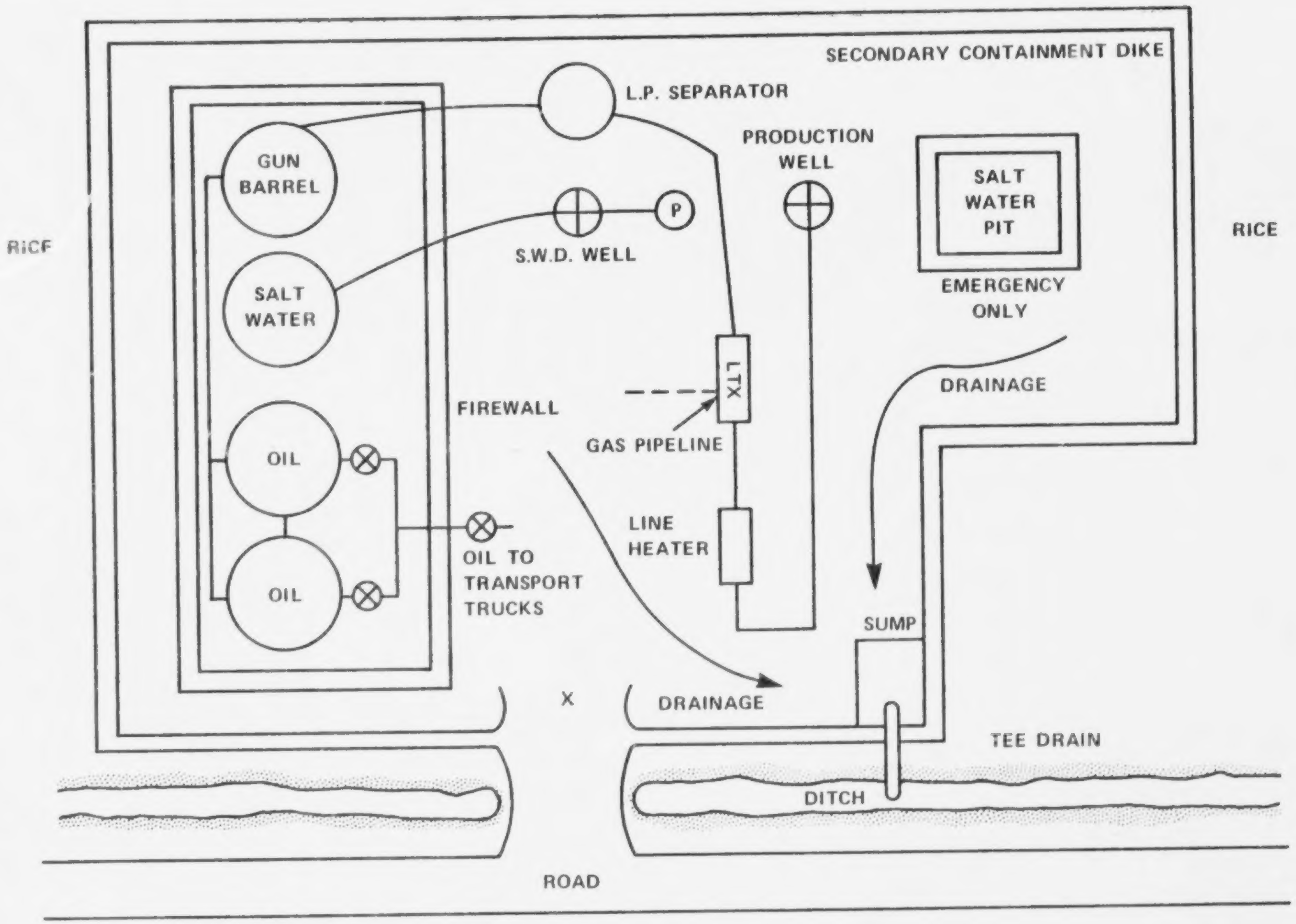
There are two distinct types of production facilities in this area: the dry-land and the water-based facility. These facility types will be discussed separately below.

Dry Land Facilities —

The generic dry-land facility is shown schematically in Figure 17. This facility operates in the following manner: The well stream flows from the producing well through a line heater to a high-pressure, low-temperature separator (LTX) unit which extracts the gas from the liquid mixture. The extracted gas is subsequently directed to a gas pipeline and the liquid continues to flow to a low-pressure separator. Gas resulting from the low-pressure separation process is either vented to the atmosphere or compressed and transferred to the gas pipeline if sufficient quantities are available. From the low-pressure separator, the well stream continues to a gun barrel which separates the oil from the water (a heater-treater can also be used). The salt water is subsequently pumped to a storage tank and then disposed of by reinjecting it into a salt water disposal well. Salt water disposal pits are also available for the storage of salt water in emergency situations. The oil that is obtained from the gun barrel is transferred to oil storage tanks from which it is delivered to trucks. The storage tanks are surrounded by a firewall which will normally hold the contents of the largest vessel. A secondary containment dike is constructed around the entire lease to contain any conceivable spill. The area within the dike is graded and drained to a sump as shown in the figure. There are, of course, many variations in the quantity of equipment, tanks, etc., as well as physical arrangement. If the well pressure is not too high, the LTX unit can be dispensed with, thereby leaving only the gun-barrel or heater-treater separation unit. Glycol units are also common to these primary gas producing wells and are used to dry the gas before it enters the pipeline.

Water-Based Facilities —

The equipment associated with and the operational characteristics of the water-based facilities are similar to the dry-land facilities. However, there are many complications that arise primarily because of their physical location. A typical facility is shown in Figure 18. All of the oil wells themselves are


SECONDARY CONTAINMENT DIKE
L.P. SEPARATOR
PRODUCTION WELL
SALT WATER PIT
RICE
RICE
GUN BARREL
S.W.D. WELL
P
SALT WATER
EMERGENCY ONLY
LTX
DRAINAGE
FIREWALL
GAS PIPELINE
OIL
OIL
LINE HEATER
OIL TO TRANSPORT TRUCKS
SUMP
X
DRAINAGE
TEE DRAIN
DITCH
ROAD

NOTE: This entrance area (X)
tends to be too low.

Figure 17. Typical on-shore facility.

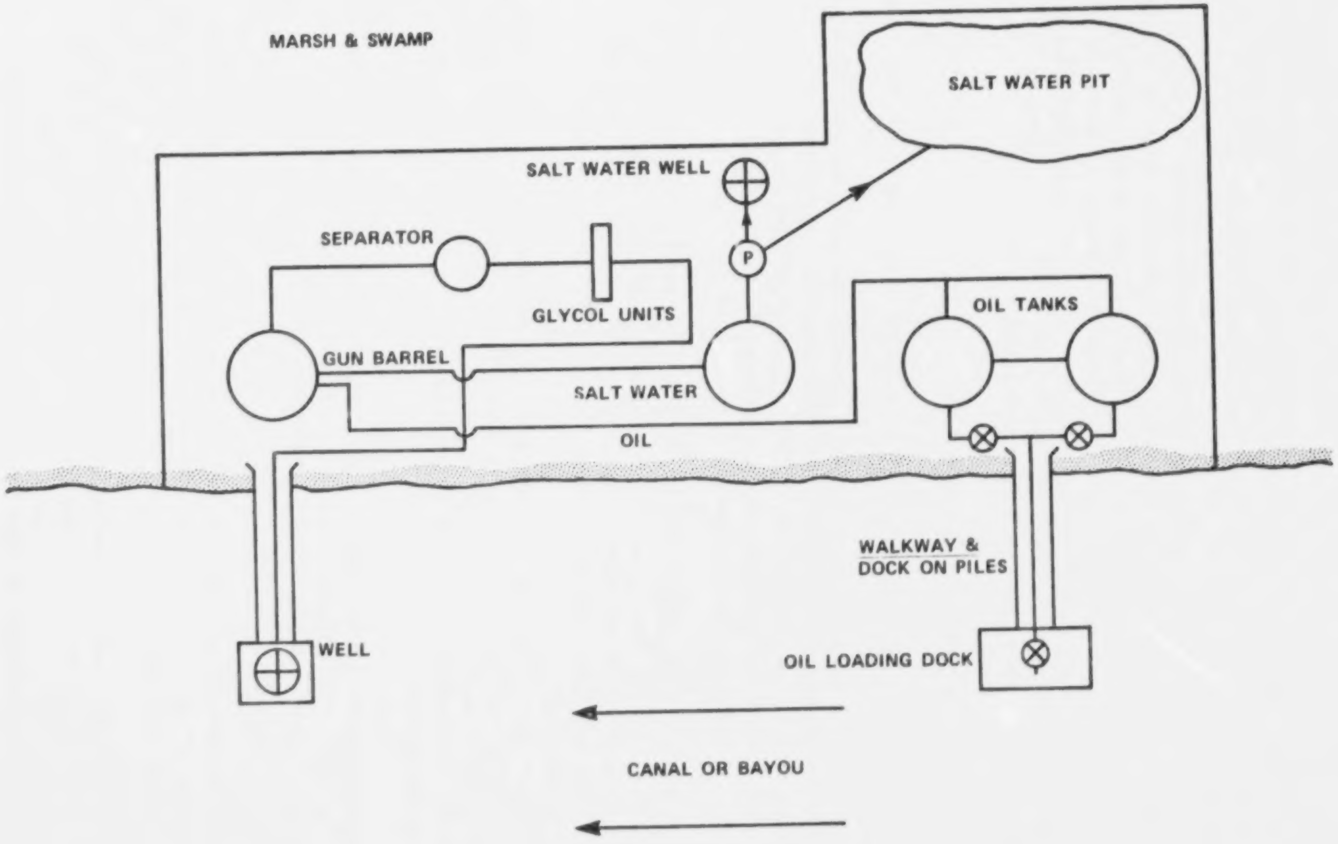

MARSH & SWAMP
SALT WATER PIT
SALT WATER WELL
P
SEPARATOR
GLYCOL UNITS
GUN BARREL
SALT WATER
OIL
OIL TANKS
WALKWAY &
DOCK ON PILES
WELL
OIL LOADING DOCK
CANAL OR BAYOU

Figure 18. Typical water location facility.

located under the canal and bayou waters. The piers which are used for loading the oil into barges are also shown in Figure 18. Any spill or leakage at these points enters directly into the navigable waters. All of the remaining components of the facility are located on the adjoining shoreline where the natural drainage is into the canal or bayou as shown in Figure 19 (a). Several other generic arrangements of the facility equipment were observed during the survey. Figure 19 (b) shows a situation in which the entire facility has been placed on piles over the water. In Figure 20 (a), a floating barge is used (in lieu of land-based storage tanks) to store the oil and salt water. Figure 20 (b) is representative of a case in which the storage of the oil and salt water is in tanks on top of a barge. The remainder of the facility's equipment in the last two cases is usually placed on the adjoining shore line. These later two types of facilities are not classified as on-shore or off-shore types by the Louisiana State Department of Conservation, but are referred to as intermediate facilities.

The Louisiana Department of Conservation —

The Louisiana Department of Conservation has contributed significantly to the achievement of reduced pollution levels from the oil and gas production industry in Louisiana. The state has been divided into six districts for this purpose and has thirty staff members in the Inspection Division and ten in the Enforcement Division. The Enforcement Division provided the study team with an appropriate guide and means of transportation into the various oil and gas producing areas.

Each production facility is visited by a state inspector at least twice a year. Moreover, every spill is inspected and a report prepared for follow-up at a later date. Some of their facility requirements are pertinent to the present study and are discussed below:

- Firewalls are required for 100 percent containment of all storage vessels within a lease only when the facilities are adjacent to highways, schools, hospitals, etc., or within the city limits. However, specific containment requirements are not listed for other situations.

- In fresh water areas, the disposal of salt water is allowable only if its concentration is less than or equal to 250 ppm. However, in salt water areas there is no limit on the salt water discharge.

- Gas wells are classified as those with a production level in excess of 15,000 cubic feet per bbl of oil, otherwise they are termed oil wells.

- All heaters or heater-treaters must be at least 100 feet from the oil storage tanks unless equipped with flame arresters.

- No gas may be vented to the atmosphere except in very small amounts and then from only those wells classified as oil producing.

Figure 19 (a & b). Typical water-based facilities in Louisiana.

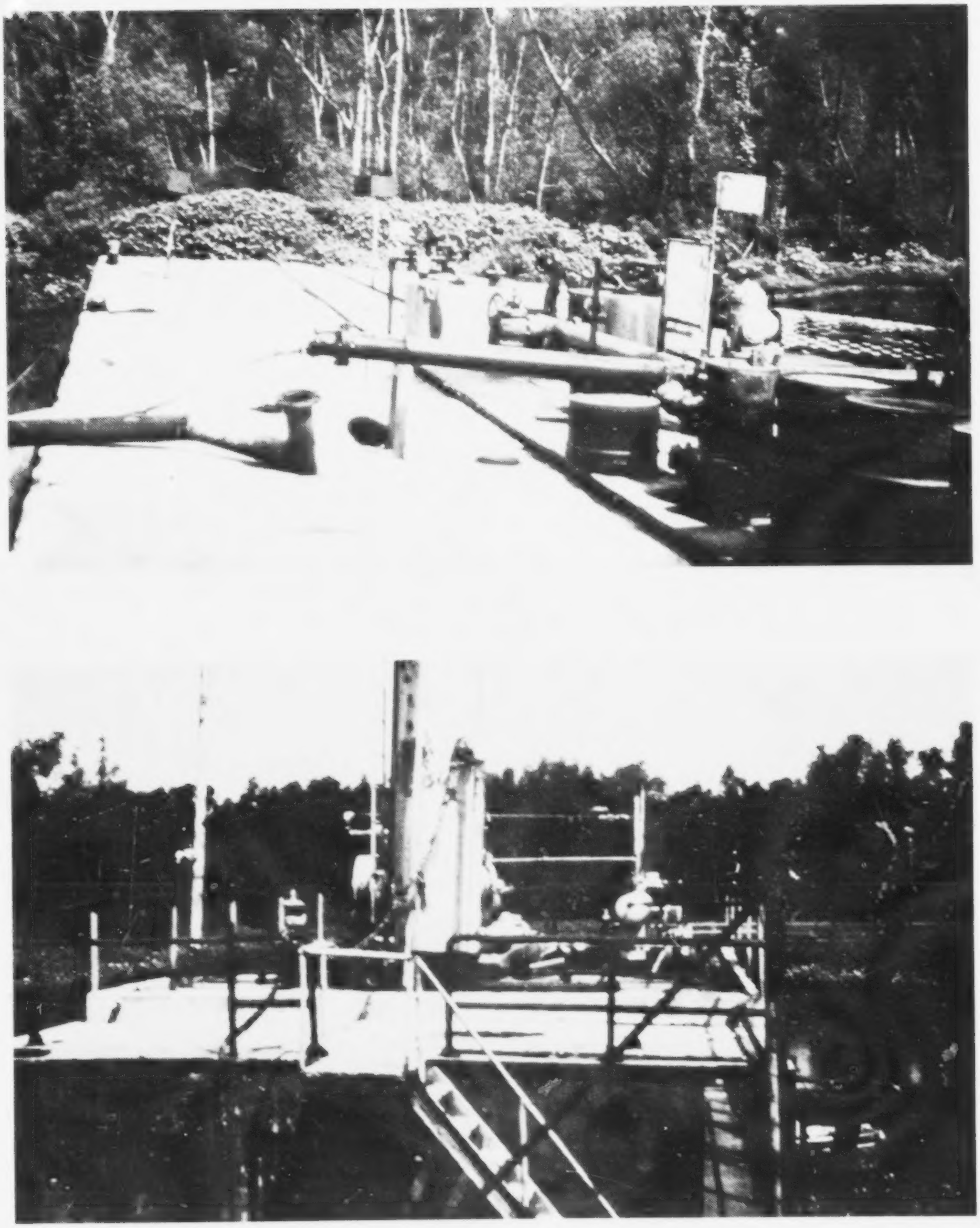


Figure 20 (a & b). Typical barge-mounted production facilities in Louisiana.

- All open storage pits (usually for salt water and BS&W) are to be deactivated and used only in emergency situations.

- Salt water disposal systems must be closed and the levels in all existing pits must be less than 2 feet from the top of the pit. This 2-foot limit also applies to dikes and firewalls. All oil spills are to be cleaned up and removed from the facility site.

Louisiana has classified oil wells within the state into three categories, as follows: 1) on-shore, 2) off-shore, and 3) intermediate. The surveys were mostly concerned with the intermediate type of oil production facility although some on-shore facilities were inspected. The intermediate facilities are those located in the area where the coastal marshes begin and terminates at the 3-mile limit. The off-shore facilities are generally those that lie beyond the 3-mile limit. A recent Federal ruling has given the authority for regulation of these off-shore production facilities to the Federal Government.

Technical Problems Encountered and Alternative Solutions

On-Shore Facilities —

The on-shore facilities surveyed were primarily in Areas 2 and 4. These facilities generally were in compliance with 40 CFR Part 112. Extensive use was made of the secondary dike for containment purposes. The only weakness observed at these facilities was in their access roads, which tended to be lower than the remainder of the dike. Figure 14 clearly shows this condition. An inexpensive solution to this problem would be to install a small ramp over the top of the dike to allow for the flow of traffic without damaging the dike. A similar situation exists for the facility shown in Figure 21 where all of the drainage comes to a low point, just to the right of the entrance. An inexpensive solution to this problem would be to install a dike across the road with a sump and sealed drain valve in the lower corner.

Within the secondary containment dike, minor oil spills appear at the truck-loading facilities (see Figure 14), the BS&W draw-down valve and the pumps. These leaks rarely get beyond the lease area itself and are generally cleaned up, leaving only a black stain on the ground.

Salt water pits should be used only in emergencies, since the evaporation potential of this area is nil. A closed system for the disposal of the salt water should be installed and the reliance, as in the past, on open pit disposal should be discontinued.

Pit dikes are generally in poor condition primarily because of the use of improper materials and in the manner in which they were constructed. Figure 22 shows a pit dike that was used for salt water and BS&W containment. The wall was breached, letting oil run out into the ditches and sugar cane fields. The clean area (repaired) inside the pit is where the break occurred. Heavy rain on top of the full pit apparently overtopped the dike to cause this spill.

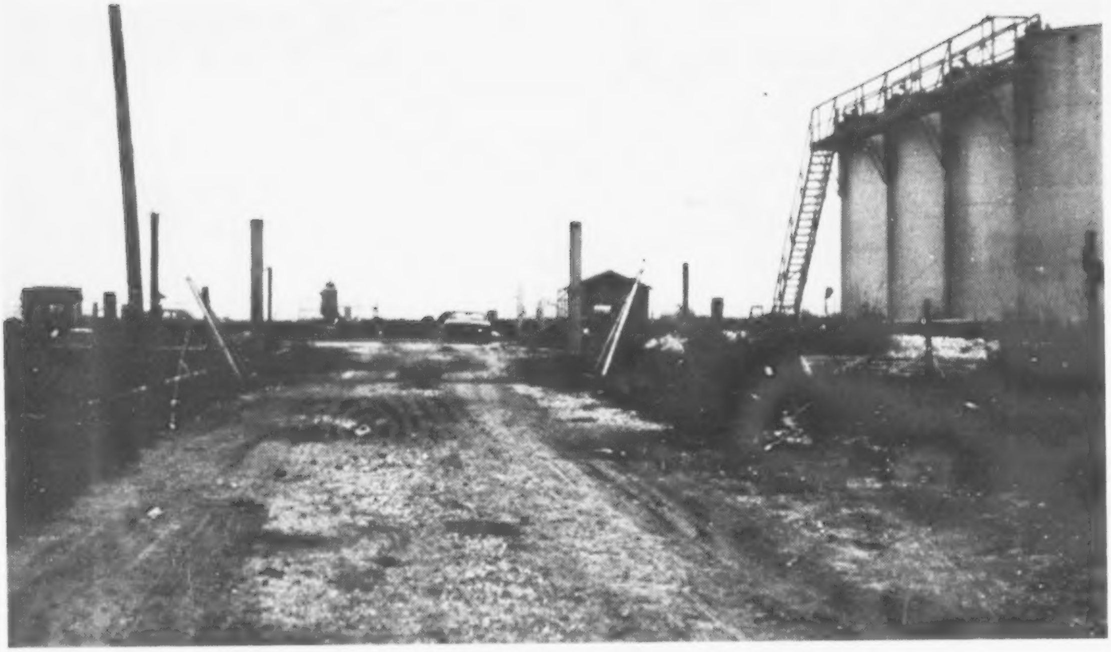


Figure 21. Typical arrangement where access road forms a breach in secondary containment dike.

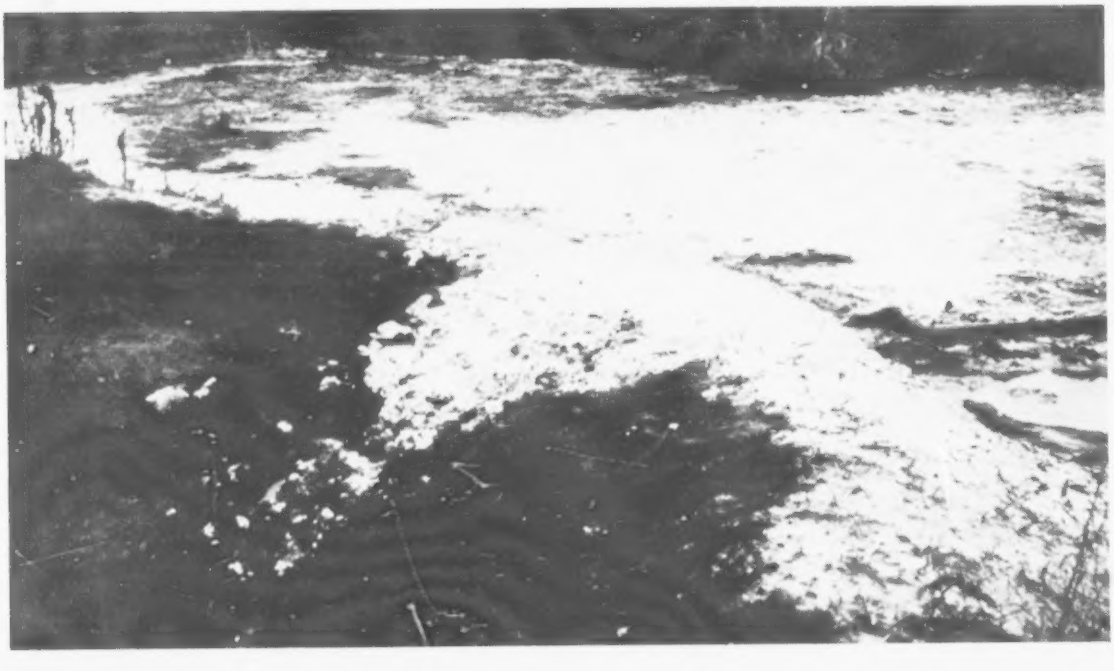


Figure 22. Consequences of a poorly designed salt water pit dike.

The installation of fences around the entire lease would be desirable, since it would prevent cattle from damaging the secondary containment dikes and prevent vandals from entering the facility area.

Water-Based Facilities —

The water-based facilities surveyed were primarily in Areas 1, 3 and 5. As noted previously, Louisiana has an intermediate facility classification which is neither on-shore or off-shore. Off-shore facilities do not have off-shore storage tanks and are compact enough to make use of drip pans and sumps. These facilities are also manned around the clock and have sufficient automatic equipment to shut down promptly in an emergency.

The facilities in Areas 1, 3 and 5 are alike in all respects except that the Area 1 facilities are in the Spillway, which is a fresh water region.

Salt water production from these wells cannot be directly input into the Spillway unless it is in concentrations of less than or equal to 250 ppm. Areas 3 and 5 are salt water and there is no restriction on the disposal of salt water resulting from the oil production operations.

In all of the installations encountered in this area, space is at a premium. The facilities are generally built on top of the canal dredgings, or on wood piles with a timber platform, or on wood piles with concrete platforms. The platforms supporting the storage tanks generally have only a 6-inch concrete curb (see Figure 23 (a)) or a metal tray (Figure 23 (b)) to prevent small leaks from entering the water. Protection against a tank rupture is generally nonexistent at these facilities.

At many of these installations, pipes generally run from the facility, unprotected from leaking into the water, to land-based storage tanks as shown in Figure 24.

All three of these areas are subject to tropical storms and, in the Spillway, flooding from the Mississippi River is always a threat. In such situations, the oil production operations must be terminated and the facilities secured until the hazard has passed.

In these areas, salt water pits should only be used for emergency purposes because they are generally severely damaged by either heavy rains or high tides.

As a result of the entremely heavy boat traffic in many of the canals and bayous, the banks are experiencing severe erosion problems as shown in Figure 25 (a). This problem can be solved by the installation of bulkheads similar to that shown for another facility in the lower photo of Figure 25 (b).

Since most of these facilities are unmanned between the hours of 5 p.m. and 7 a.m., any problems that develop can go undetected for as long as 14 hours.

The delivery of equipment to this area must be by barge, boat or airplane. In either of these cases, the costs associated with this mode of transport are very high.

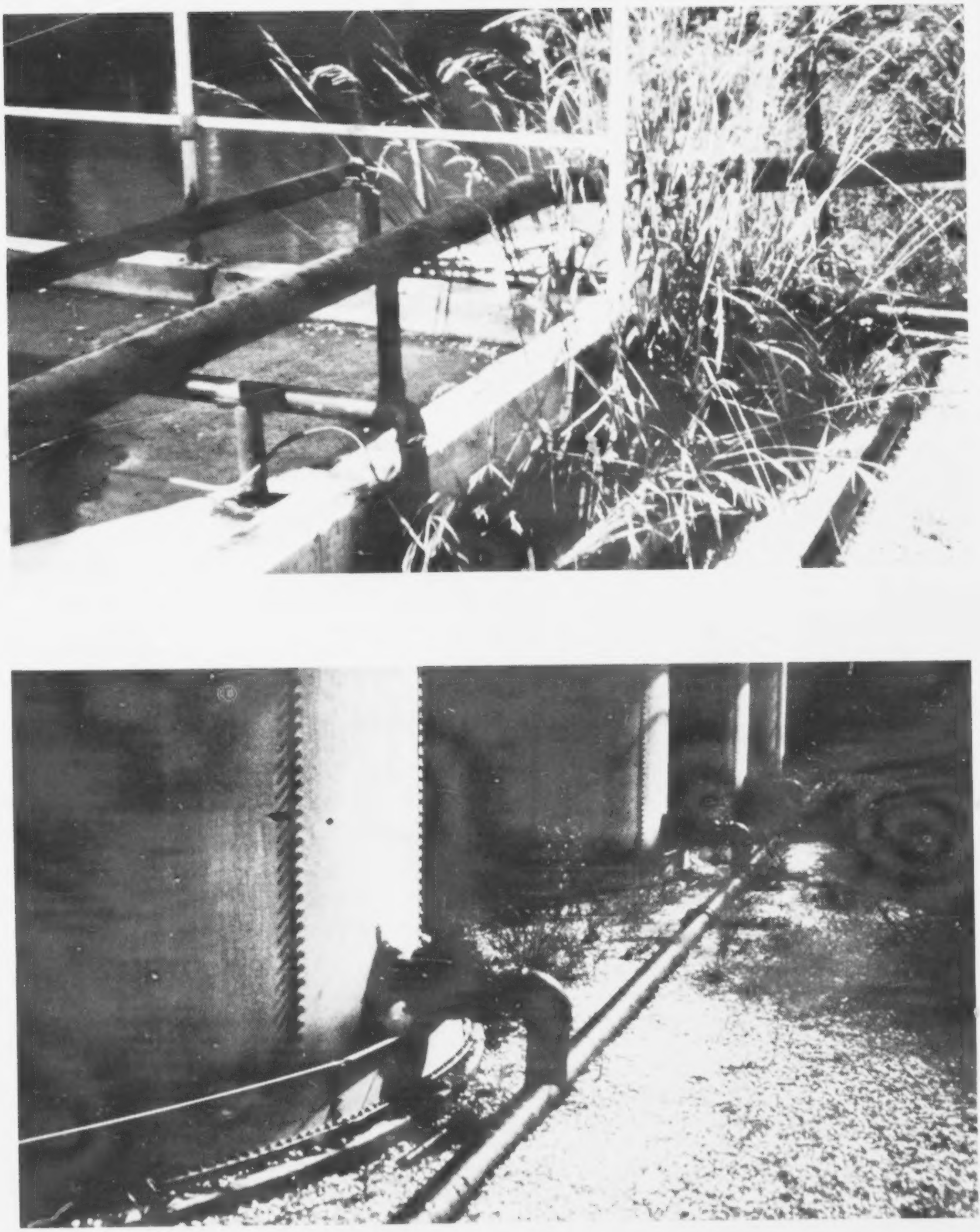


Figure 23 (a & b). Typical minimal leak protection at platform-mounted water-based facility.

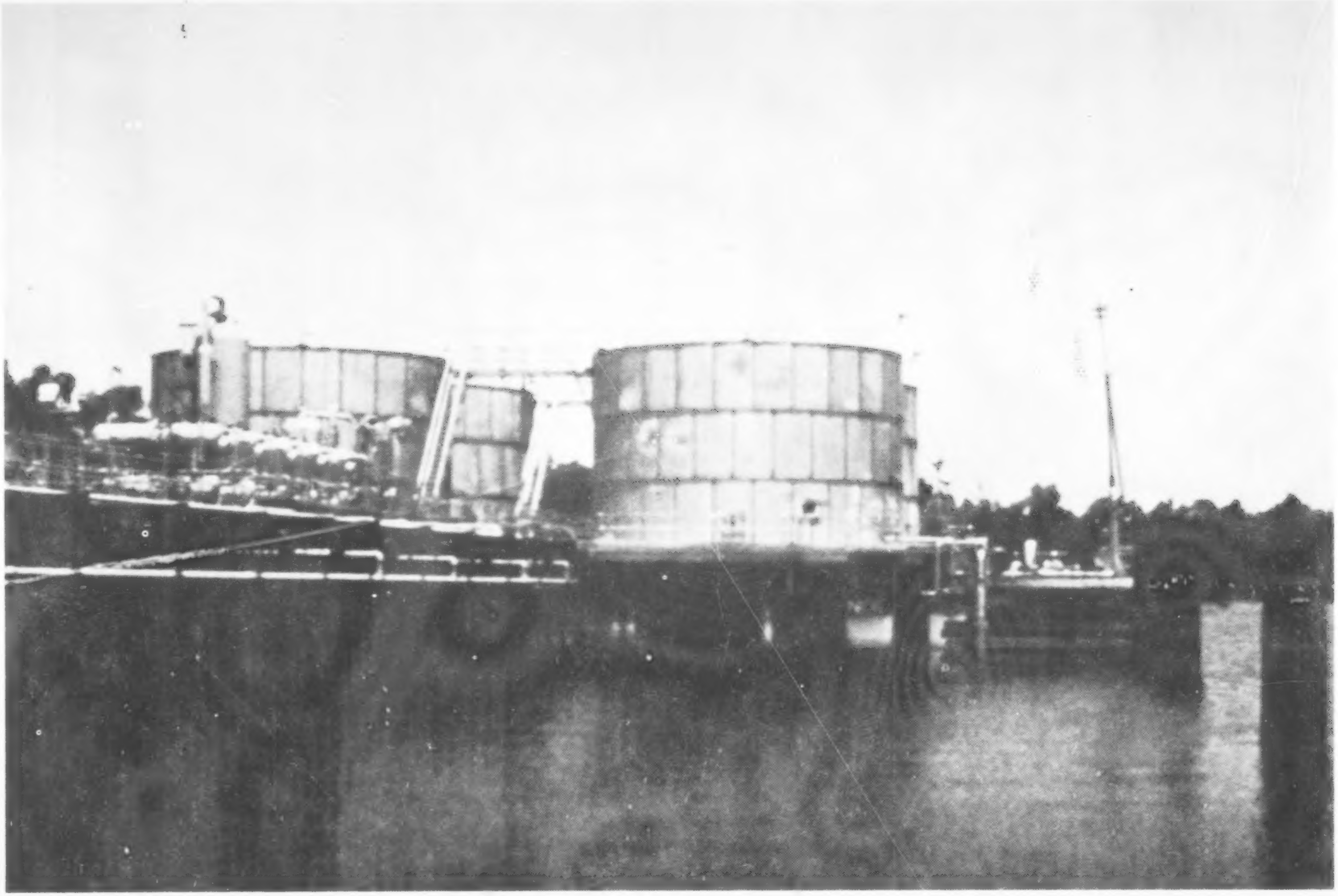
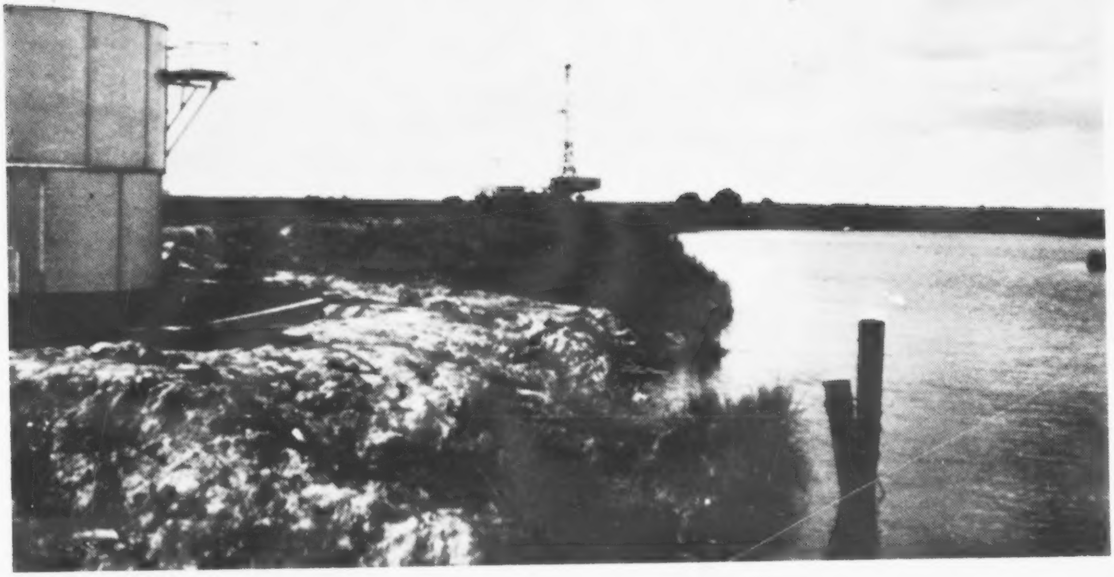


Figure 24. Typical unprotected over-water piping at water-based facilities.



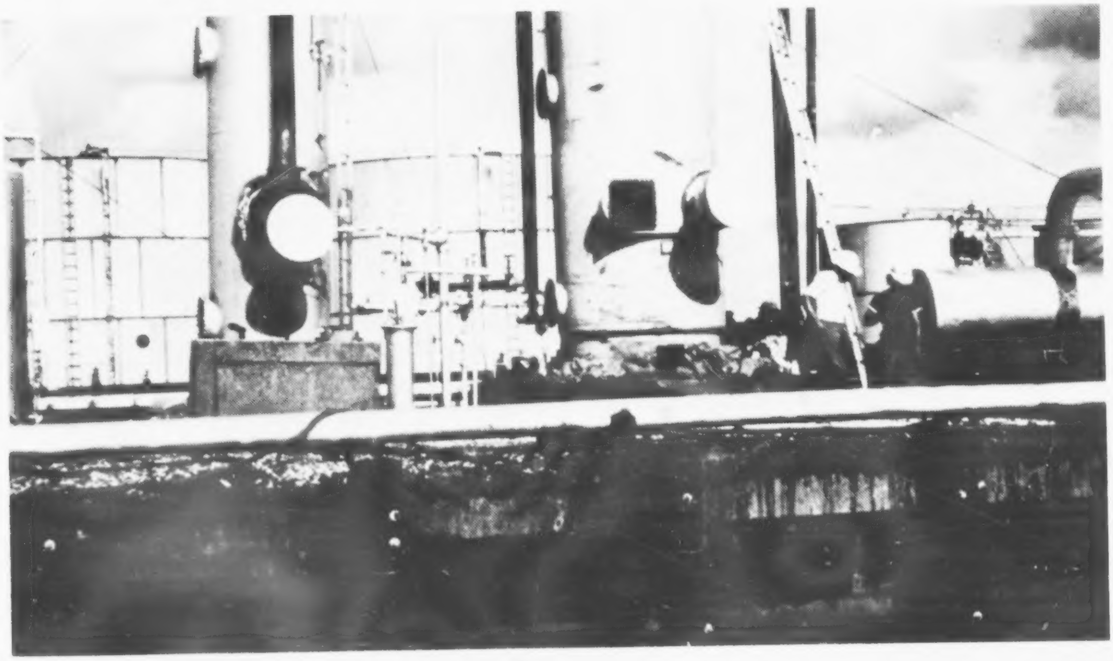


Figure 25 (a & b). Water-traffic-induced bank erosion at a water-based facility (a) and typical bulkheads used to correct the erosion problem (b).

The types of problems that have been encountered in this region preclude the use of any simple and/or inexpensive containment procedures.

At the present time, the recommendation is for a strong countermeasure plan which would depend heavily on the use of booms to contain and control an oil spill.

For installations along the shoreline, some grading or ditching to a sump can be employed to contain minor leaks or spills. The grading should be performed in such a manner as to direct the spilled material to the waterway rather than into the marshes where it will be very difficult, if not impossible, to clean up.

A closed system for the disposal of salt water should be installed at all installations. Provisions should also be made to recirculate BS&W and oil spilled from normal operations. Before the accumulation of this material becomes too great, it should be removed from the site.

During maintenance and transfer operations, the use of drip pans should be encouraged as an inexpensive method of preventing spills.

Discussion of Existing SPCC Plans

Most of the existing SPCC plans are very brief and reflect the lack of effort employed in their preparation. All of the SPCC plans reviewed during the survey have followed the API format. Moreover, there is little evidence that any changes have been made to the facility as a result of the preparation of the SPCC plans. It is more likely that the plan was prepared based on what existed at the facility at the time of plan preparation.

Appendix C contains three SPCC plans which represent the most complete and satisfactory of those that were reviewed during the survey. The plan for Facility #1 is by far the best, and it has been implemented, as can be seen by referring to Figure 14.

The plans for Facilities #2 and #3 were rated better than average; however, there were some discrepancies. Facility #2 includes an off-shore well, and Part 1, page 2 describes potential spills from lines between the well and the on-shore facilities. However, Part II, Alternate B, pages 1 and 2, describes the on-shore facilities, but the information concerning spills from these is not included on page 2 of Part I. There are also conflicting answers to questions 7 and 8 in Part I.

Recommended SPCC Plans

A series of recommended SPCC plans for the generic types of on-shore and water-based facilities in the Louisiana Area are presented in Appendix F. As in the case of recommended plans for the Texas/Oklahoma area, a key feature of these plans is that they are designed to prompt considerable thought on the part of the owner/operator, and to preclude the use of "yes" or "no" answers to a set of prescribed questions.

Conclusions: Louisiana Area

The following conclusions are a result of conversations, observations and data collected during this survey:

1) For on-shore facilities, very few signs of pollution were observed except in the immediate vicinity of the lease. With respect to the intermediate locations, even small leaks constitute a spill event, and a number of them were observed as oil-stained shorelines.

2) Tank ruptures pose more of a pollution threat to intermediately located facilities than to the on-shore facilities.

3) Housekeeping and maintenance could be improved throughout the entire area without expending a significant amount of funds. In the intermediate locations, there are not any land owners to keep the facility operator in line; however, the State is doing an excellent job in this respect.

4) A closed system for salt water disposal and drainage from leaks or spills should be implemented at the intermediate locations. The use of pits should be abandoned, except in emergency situations.

5) In areas where there is an excessive amount of boat traffic, erosion of the neighboring shoreline has been significant. The installation of bulkheads is one way of countering this problem.

6) The cost of pollution controls or countermeasures at the intermediate locations will be high. Floating booms for spill control costs in the neighborhood of $12 per foot. Materials for the construction of dikes, bulkheads, etc., must be brought to the site by boat, which is also expensive.

PENN-GRADE AREA

Introduction and Summary

The objectives of this portion of the study were to survey a representative sample of the stripper-well industry and bulk-oil distribution facilities in the Penn-Grade area (Pennsylvania, Ohio and West Virginia) in order to determine the problems these facilities are experiencing in complying with 40 CFR Part 112; and to recommend a number of alternative solutions to these problems. The solutions will be in the form of generic SPCC plans for the various categories of facilities identified during the survey aimed at cost-effective implementation requirements and providing adequate protection of the environment. The generic SPCC plans are presented in Appendix G.

The area covered by this survey includes the oil production and fuel distribution facilities operating along either side of the Ohio and Allegheny Rivers from Point Pleasant, West Virginia, to Bradford, Pennsylvania. A map of the survey area is shown in Figure 26. Among the many sites surveyed in the Penn-Grade area are those that represent some of the earliest production in the U. S.

All of the oil production facilities visited in this area were of the stripper-well type which, by definition, produce less than 10 bpd. However, the majority of the stripper wells surveyed produce far less than 3 to 5 bpd. According to the figures quoted in the National Stripper Well Survey (January 1, 1975), Ohio production averaged 1.2 bpd/well, West Virginia was 0.55 bpd/well, and Pennsylvania was 0.29 bpd/well. The total number of wells in the Penn-Grade area is about 61,000, with a total annual production of 12.5 million barrels.

The wells that produce the oil in the Penn-Grade area are owned/operated by individuals ("Ma and Pa" operators); small independents (30 to 100 wells) and larger commercial organizations such as Kendall, Quaker State and Pennzoil. Quaker State and Pennzoil account for nearly 30 percent of the total production from this area.

Representative SPCC plans from West Virginia, Ohio, and Pennsylvania are given in Appendix D. The general formats for these plans are almost identical. From the survey it was estimated that approximately 30 to 50 percent of the "Ma and Pa" operators had SPCC plans, whereas up to 90 percent of the small independent operators had prepared plans and all of the larger commercial companies had plans. Obtaining ownership data for the "Ma and Pa" operators on a timely basis was almost impossible because of the frequency with which the facilities changed hands and the general unavailability of the owners.

No evidence of any major spills involving the bulk distributors was found and very little evidence of even small spills was noted. For the stripper-well facilities, even though the daily production is small, a substantial spill potential exists since many of these facilities go unattended for very long time periods. Several months is routine and no attendance for as long as a year is not uncommon. Frequently, the only person who sees any part of the facilities during these periods would be the pumper. Even then, he might see only the storage tanks, which are often some distance removed from the rest of the facility. Moreover, for low-production wells, the intervals between collections can be many months. The storage tanks for the stripper facilities generally had a capacity of 100 bbl, with an occasional facility having a 200-bbl-capacity tank. Spills from these facilities, in the event of a tank rupture, would probably not approach 100 bbl since the tanks are not often filled to that capacity, depending on the collection schedule. Nonetheless, the potential does exist. Spills observed in the Penn-Grade area generally were the result of tank overfilling, leaking pump packings and leaks in the pipelines leading from the wells to the storage tanks.

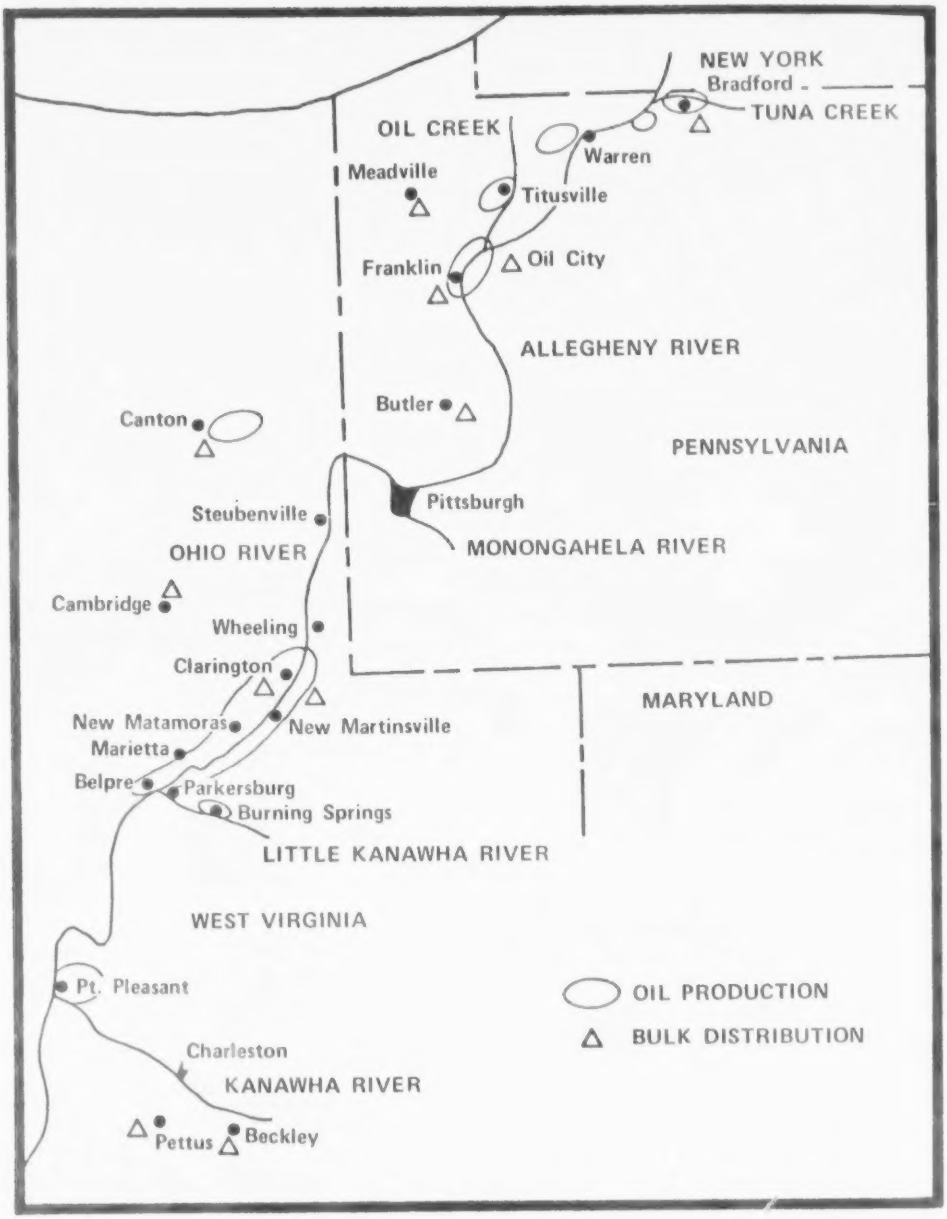

NEW YORK
Bradford
TUNA CREEK
OIL CREEK
Warren
Meadville
Titusville
Franklin
Oil City
ALLEGHENY RIVER
Butler
Canton
PENNSYLVANIA
Pittsburgh
Steubenville
MONONGAHELA RIVER
OHIO RIVER
Cambridge
Wheeling
Clarington
MARYLAND
New Matamoras
New Martinsville
Marietta
Belpre
Parkersburg
Burning Springs
LITTLE KANAWHA RIVER
WEST VIRGINIA
Pt. Pleasant
OIL PRODUCTION
BULK DISTRIBUTION
Charleston
KANAWHA RIVER
Pettus
Beckley

Figure 26. Map indicating the Penn-Grade area surveyed.

Description of the Survey Area

The terrain in the Penn-Grade area is mountainous and rugged. The particular survey area follows river valleys with mountains on either side, and the flood plains vary from practically nothing to as much as 2,500 feet. Figure 27 depicts typical urban area terrain (in this case, at Oil City, Pennsylvania). The soil in this area is of the residual type, weathered in place from sandstone and limestone with little or no alteration by transport. The ground is covered with grasses and plants and the hills are heavily wooded with pine and hardwood forests. Generally, the climate is rather severe along the Allegheny River, with long cold winters and warm but short summers; however, along the Ohio River, the climate is somewhat milder. The rainfall in this area varies between 30 and 35 inches annually. Evaporation is reasonably high, but not sufficient to be a factor with respect to oil spills reaching waterways. Stream valleys are numerous, and stripper wells are not very far from one or more streams.

Description of Stripper Well Facilities in the Penn-Grade Area

The survey covered over twenty different stripper-well facilities consisting of about 125 distinct wells. The entire production of the Penn-Grade area is a paraffin-based oil which, when refined, produces a superior grade of lubricating oil. This type of oil separates from water easily, so the equipment needed in the production process is less complicated than required in other areas of the country. In this respect, gun-barrels, heater-treaters and oil/gas separators are not required.

The facilities generally consist of two 100-bbl oil storage tanks which are interconnected to prevent overfilling. The tanks are usually located below the well or wells and along or adjacent to a highway or all-weather access road. In about 20 to 30 percent of the facilities surveyed, a single 100-bbl storage tank was in use. These tank batteries are generally connected to from one to twenty wells which are located anywhere from 50 to 1,200 yards from the storage tanks. All of the wells in this area are being pumped and it is common to see a number of them interconnected through sucker rods or cables to a central source of power. The well depth in the Penn-Grade area is shallow and generally varies between 700 and 1,500 feet.

The recovery of oil from these wells is by secondary means. By far the dominant secondary recovery method is fresh-water flooding and, as a consequence, increasing amounts of salt water are generated with the passage of time. In this area, when wells are on primary recovery, the salt water quantities are nil. But, when water flooding is employed, the fresh water pumped down takes on salt as it passes through the formations. The resultant oil-to-salt water ratio is low at first, but increases gradually as the oil pool is depleted. The producers have found that water flooding can be employed for about 15 years before the economic limit is reached. Generally, salt water production in the area is not high enough to create a difficult disposal problem. As a rule, water production does not currently exceed 50 percent of the well stream and the evaporation rate is high enough to keep the problem under control if proper disposal techniques are employed. This means a well-designed salt water collection pit, equipped so that the water can be siphoned off at

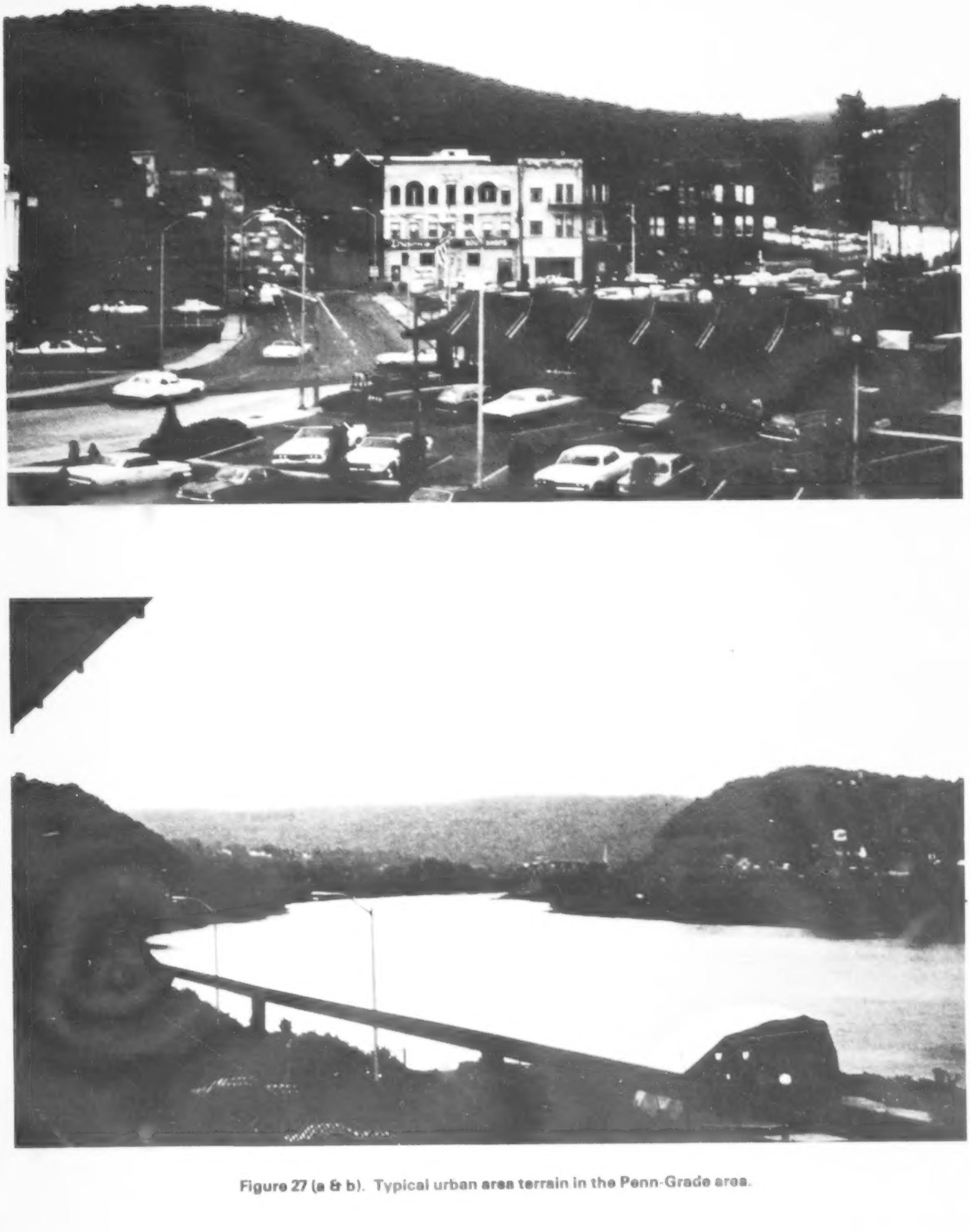


Figure 27 (a & b). Typical urban area terrain in the Penn-Grade area.

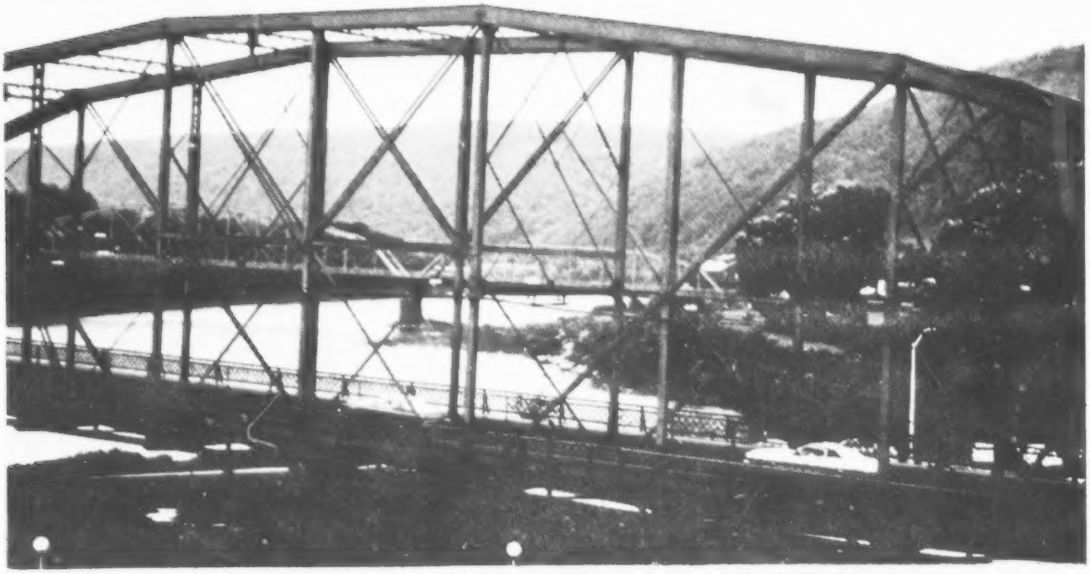


Figure 27 (c). Typical urban area terrain in the Penn-Grade area.

controlled rates. Gas has also been used to pressurize these wells but the geologic structure is too porous for it to be effective.

The diking of tanks is not normally practiced in this area, primarily because of the difficult terrain. However, the area around the tank battery is usually graded to drain into a pit. These pits are generally equipped with a siphon-type overflow, as indicated by Figure 28, leading directly to natural drainage swales, brooks, and dry runs. The drainage areas are normally clean; however, in a few cases a scum of oil has been observed on some of these surfaces. In areas where wells are remote from the tank batteries, water knockouts and pits have been installed.

The majority of pumping units are electrically operated and many are on time clocks. The average well is pumped only once or twice a day for periods ranging from 15 minutes to 2 hours.

Most of the pumping units are not visible from the tank battery because of their location in the woods. The layouts of two complete facilities of this type are schematically shown in Figures 29 and 30.

The facilities depicted by Figures 29 and 30 are operated by two distinct independents. The facility shown in Figure 29 represents two adjacent leases in West Virginia. The three wells on the Lucas lease produce a total of 6 bpd, while the two wells on the Schultz lease produce 7 bpd. All piping for these

APPENDIX 4 – SKETCH 1

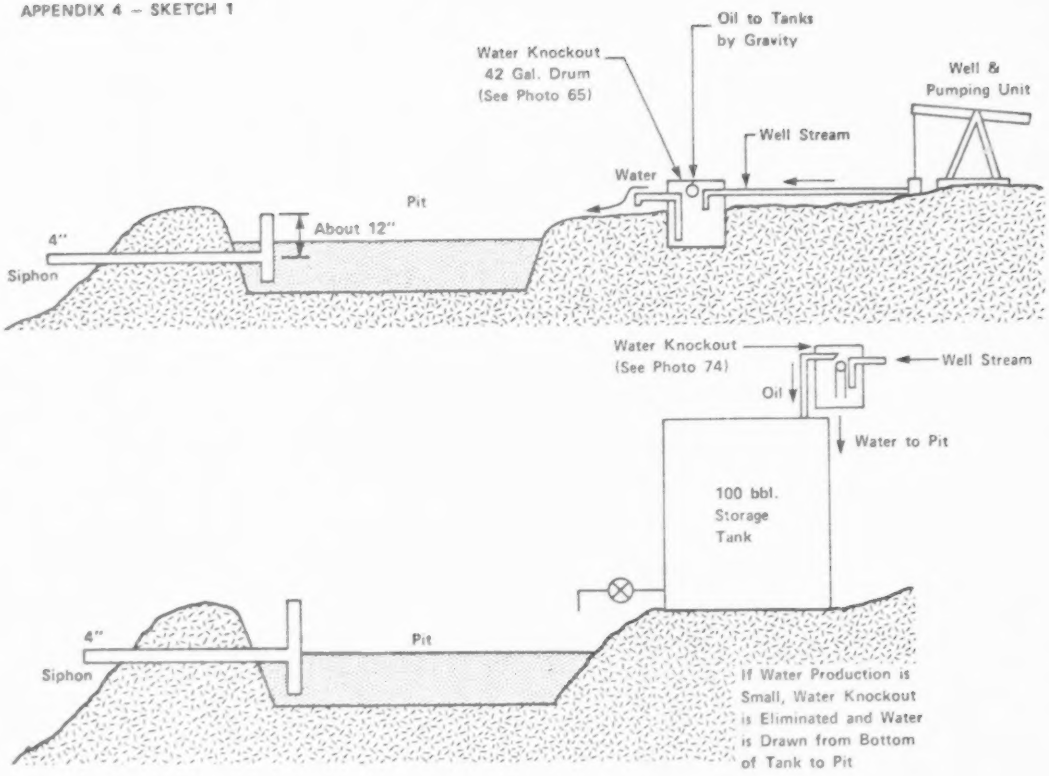

Oil to Tanks
by Gravity
Water Knockout
42 Gal. Drum
(See Photo 65)
Well &
Pumping Unit
Well Stream
Water
Pit
About 12"
4"
Siphon
Water Knockout
(See Photo 74)
Well Stream
Oil
Water to Pit
100 bbl.
Storage
Tank
Pit
4"
Siphon
If Water Production is
Small, Water Knockout
is Eliminated and Water
is Drawn from Bottom
of Tank to Pit

Figure 28. Typical stripper facility arrangement in the Penn-Grade area.

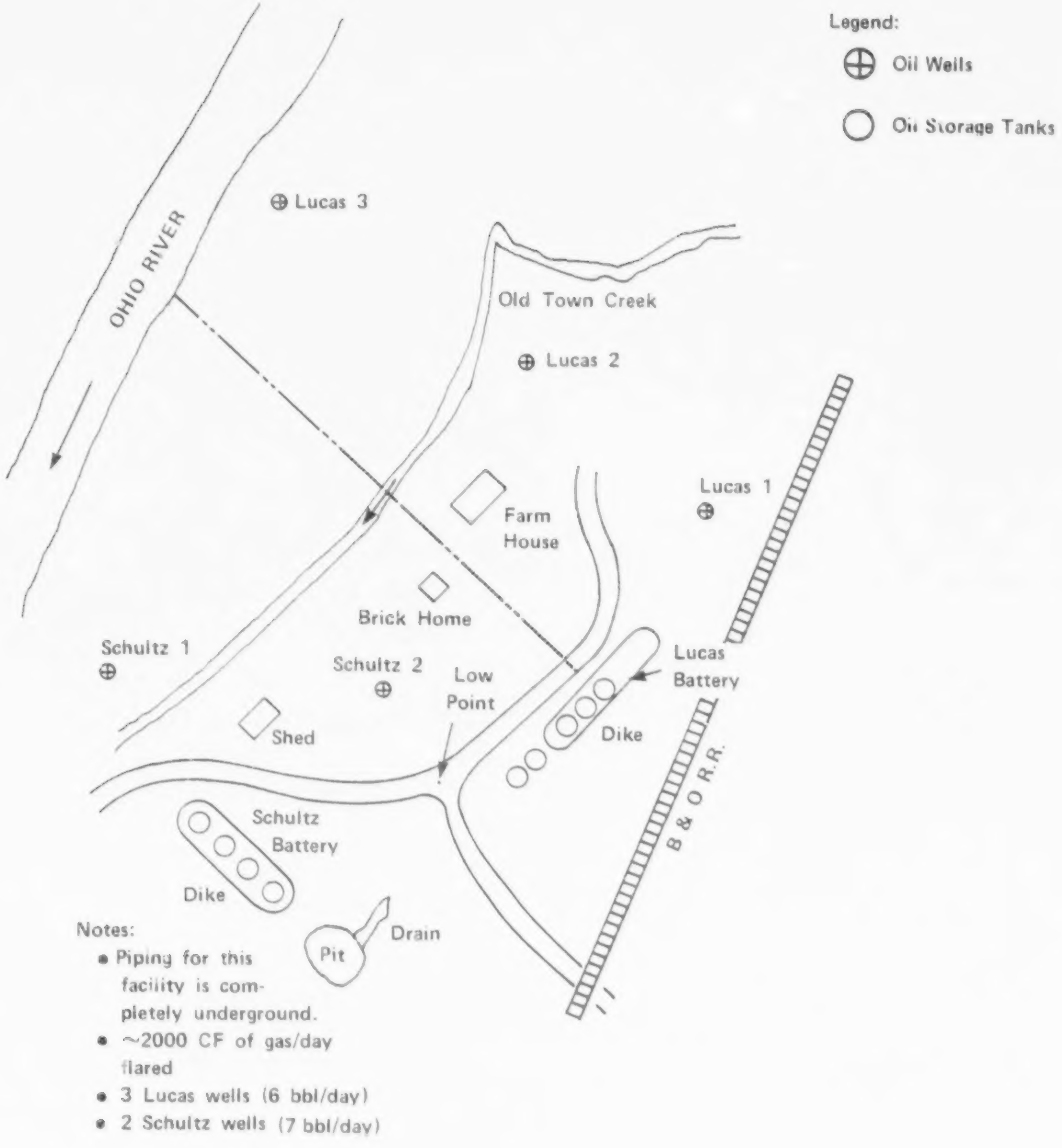
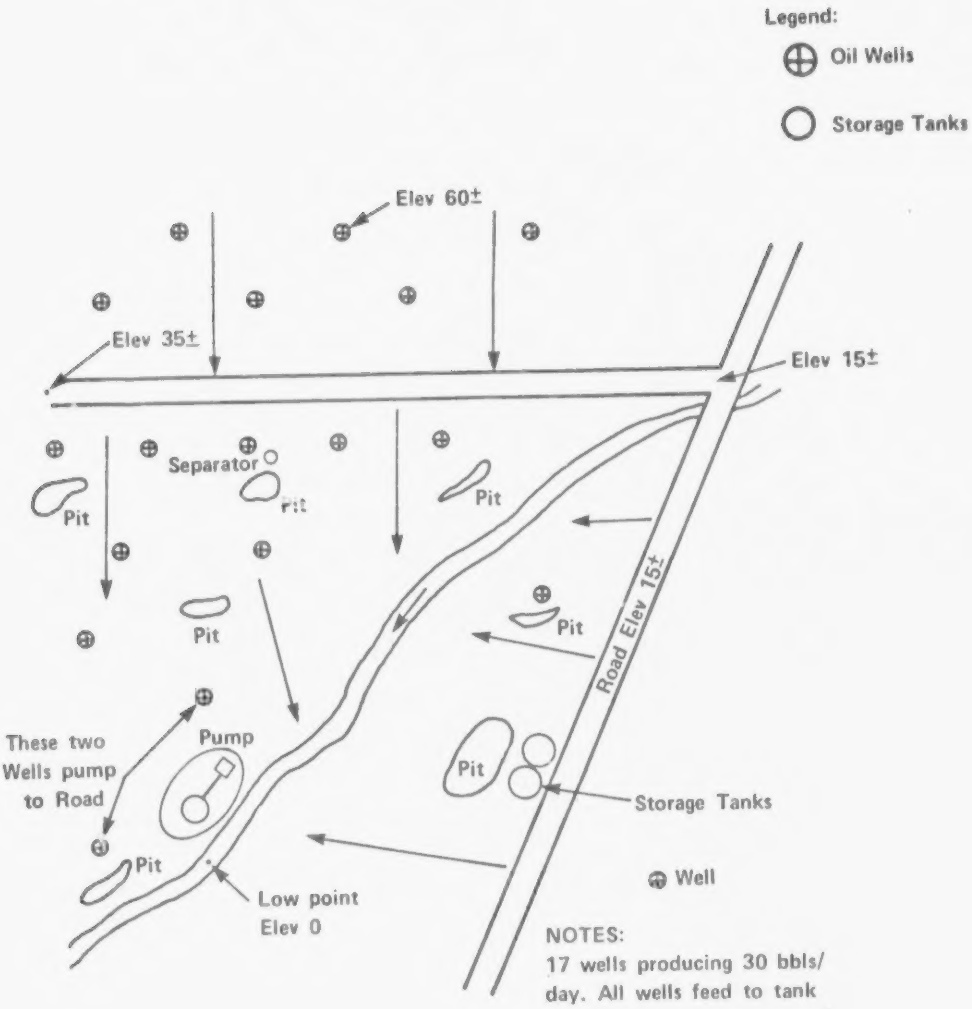

Legend:
⊕ Oil Wells
○ Oil Storage Tanks
OHIO RIVER
Lucas 3
Old Town Creek
Lucas 2
Lucas 1
Farm House
Brick Home
Schultz 1
Schultz 2
Low Point
Lucas Battery
Dike
Shed
B & O R.R.
Schultz Battery
Dike
Pit
Drain
Notes:
• Piping for this facility is completely underground.
• ~2000 CF of gas/day flared
• 3 Lucas wells (6 bbl/day)
• 2 Schultz wells (7 bbl/day)

Figure 29. Multiple well stripper facility layout, West Virginia.


Legend:
⊕ Oil Wells
○ Storage Tanks
Elev 60±
Elev 35±
Elev 15±
Separator
Pit
Pit
Pit
Pit
Pit
Pit
Pit
Road Elev 15±
These two Wells pump to Road
Pump
Storage Tanks
⊕ Well
Low point Elev 0

NOTES:

17 wells producing 30 bbls/ day. All wells feed to tank by gravity except two noted. All pits are not shown.

Area covered about 2000 ft x 2000 ft (not to scale)

Pipe above ground except for road crossings.

Figure 30. Multiple Well Stripper Facility Layout, Pennsylvania.

two leases is underground because of the joint land use (between oil production and farming) provisions in this area. Photographs of the properties are shown in Figure 31.

The lease represented in Figure 30 consists of 17 wells located in a forested area of Pennsylvania. The total production from the lease is about 30 bpd. Figure 32 illustrates the appearance of the property.

Figure 33 depicts the property of an independent operator in Pennsylvania having 60 wells and 10 storage tanks, and which produces about 50 bpd. The lease is long and narrow and runs from a creek across flood plain to a highway, across the highway and up along the hillside. Figure 33 (a and b) shows one of the tank batteries with water knockout similar to that shown in the schematic drawing of Figure 28. Figure 33 (c) represents a typical electrically operated well installation and Figure 33 (d) shows a typical pit in the flood-plain area used to catch discharged water and spills.

A typical small off-highway/hillside production operation is shown in Figure 34. The facility consists of the three pumping units shown in Figure 34 (a); the tank battery with water knockout appears in Figure 34 (b).

Many other installations were visited during the survey; however, it would be repetitive to discuss all of them here.

Technical Problems Encountered

The technical problems encountered in the Penn-Grade area stem primarily from the following set of circumstances: 1) nearly all of the oil is being produced by the application of secondary recovery methods, mostly water flooding; 2) the production from any given well is uncertain at all times, and 3) new wells must be drilled each year to maintain current production levels. A new well costs in the neighborhood of $12,000 (at 1974 cost levels). In order to recover the drilling costs, this new well must produce between 20 and 40 bpd for a time period of 2 to 6 weeks. Thereafter, the production rate decreases to less than 1 bpd. If a new well is able to perform in this manner, the operation is considered productive; if not, it usually results in a loss to the owners/operators.

The technical and operational problems in this region result essentially from inaccessibility of the area. The rugged terrain and normally heavily wooded areas presented here make access for equipment maintenance and the construction of dikes and pits very difficult. For these reasons, backhoes are normally used in place of bulldozers for dike and pit construction, and the installation of pipe (above or below ground) usually involves an inordinate amount of very expensive hand labor.

In order to maintain production in cold weather, the pipes and tanks must be heated. Because of the costs involved in heating the equipment, the facilities are not normally operated during the very cold weather.

Another operational problem that results in technical difficulties is that these wells are operated on an intermittent basis. The total pumping

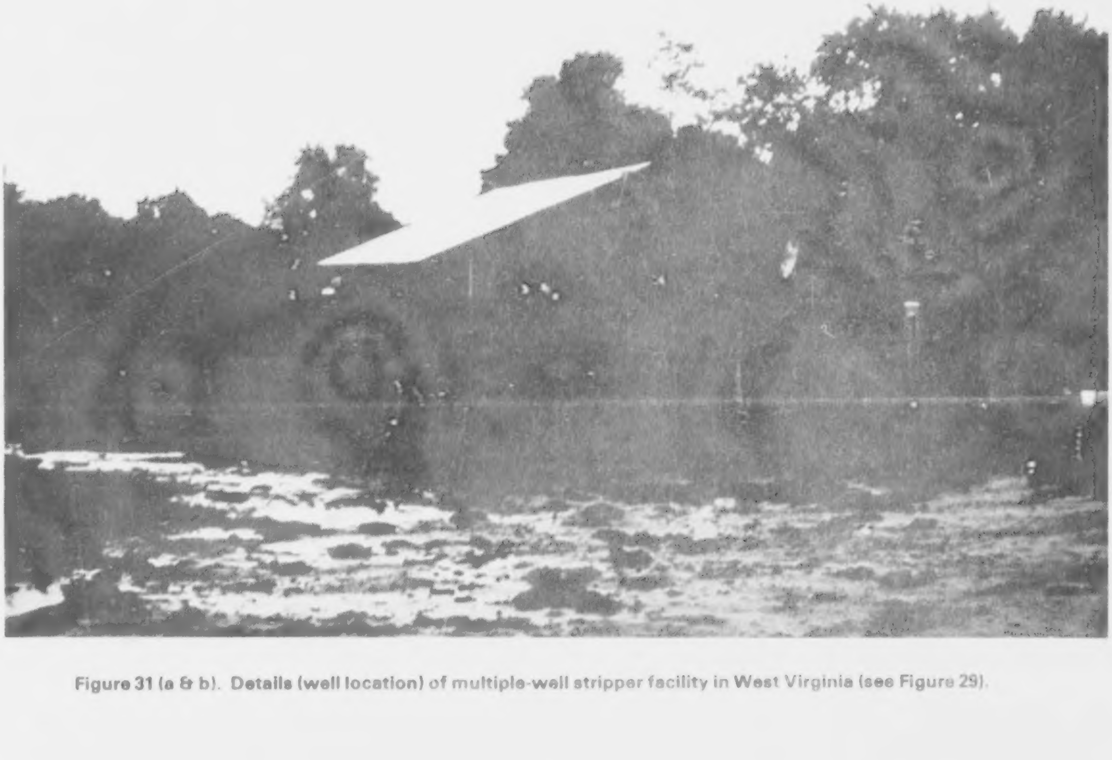


Figure 31 (a & b). Details (well location) of multiple-well stripper facility in West Virginia (see Figure 29).

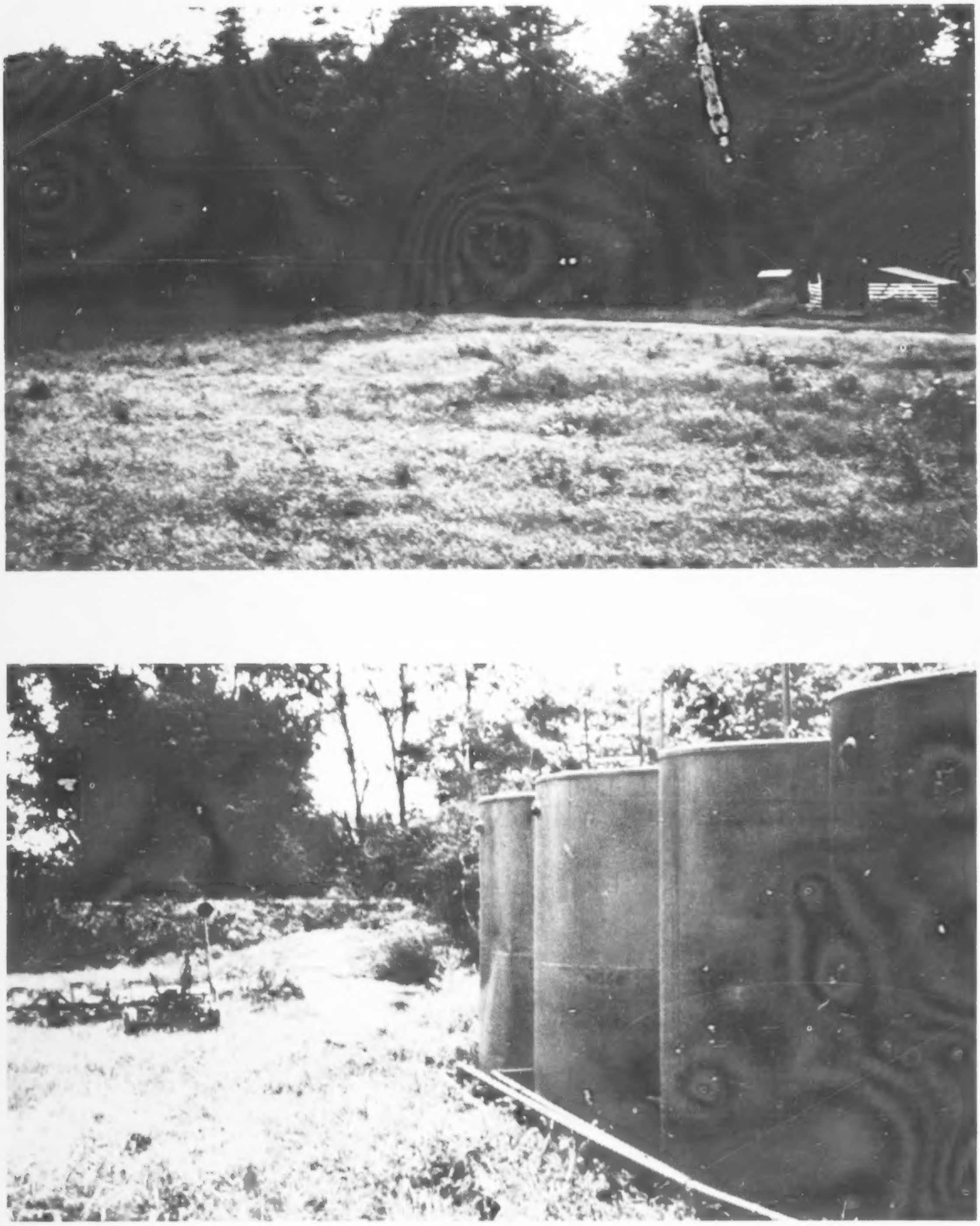


Figure 31 (c & d). Details (storage tanks) of multiple-well stripper facility in West Virginia (see Figure 29).

Figure 31 (e & f). Details (well locations) of multiple-well stripper facility in West Virginia (see Figure 29).

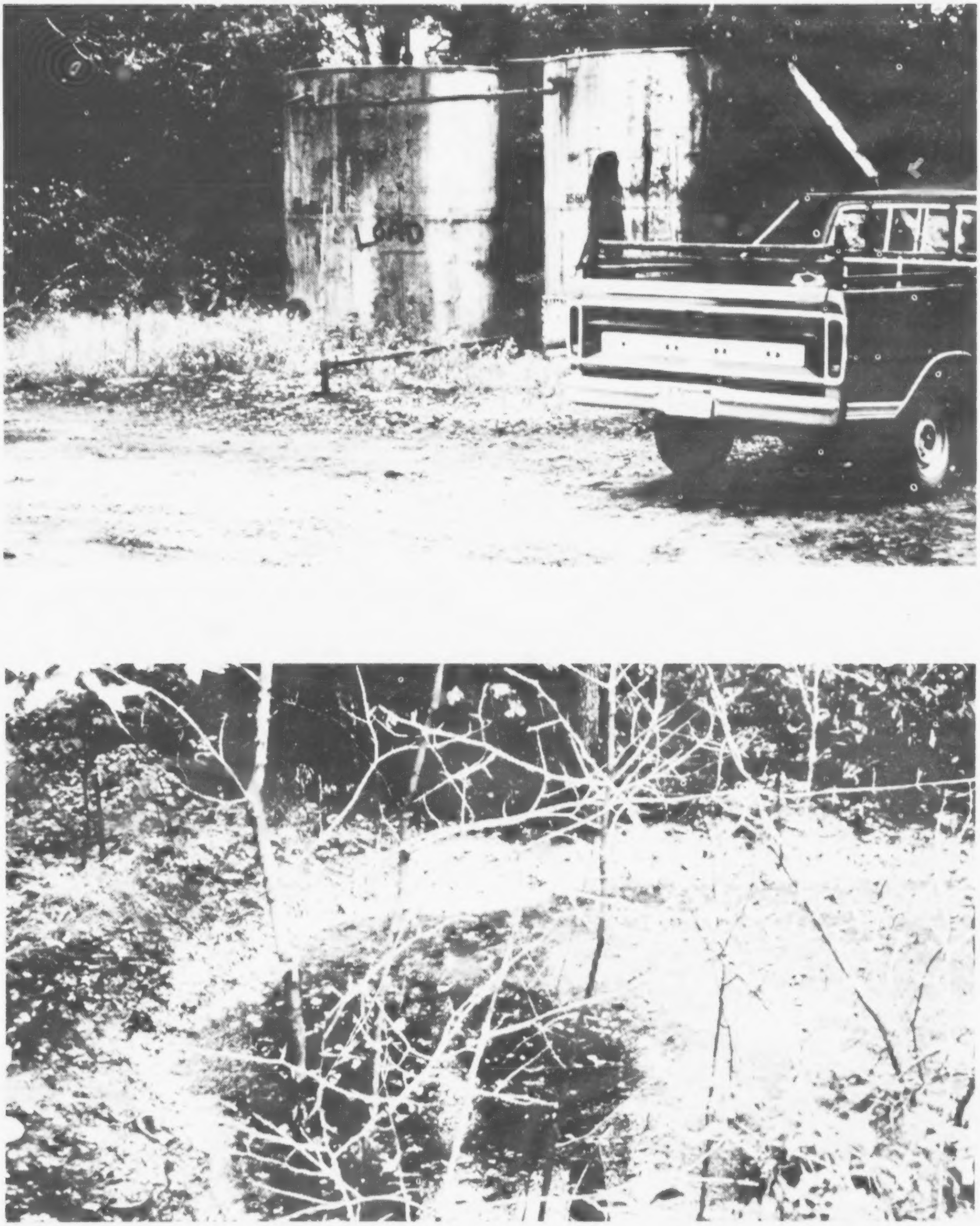


Figure 32 (a & b). Details (storage tanks and drainage pit) of multiple-well stripper facility in Pennsylvania (see Figure 30).

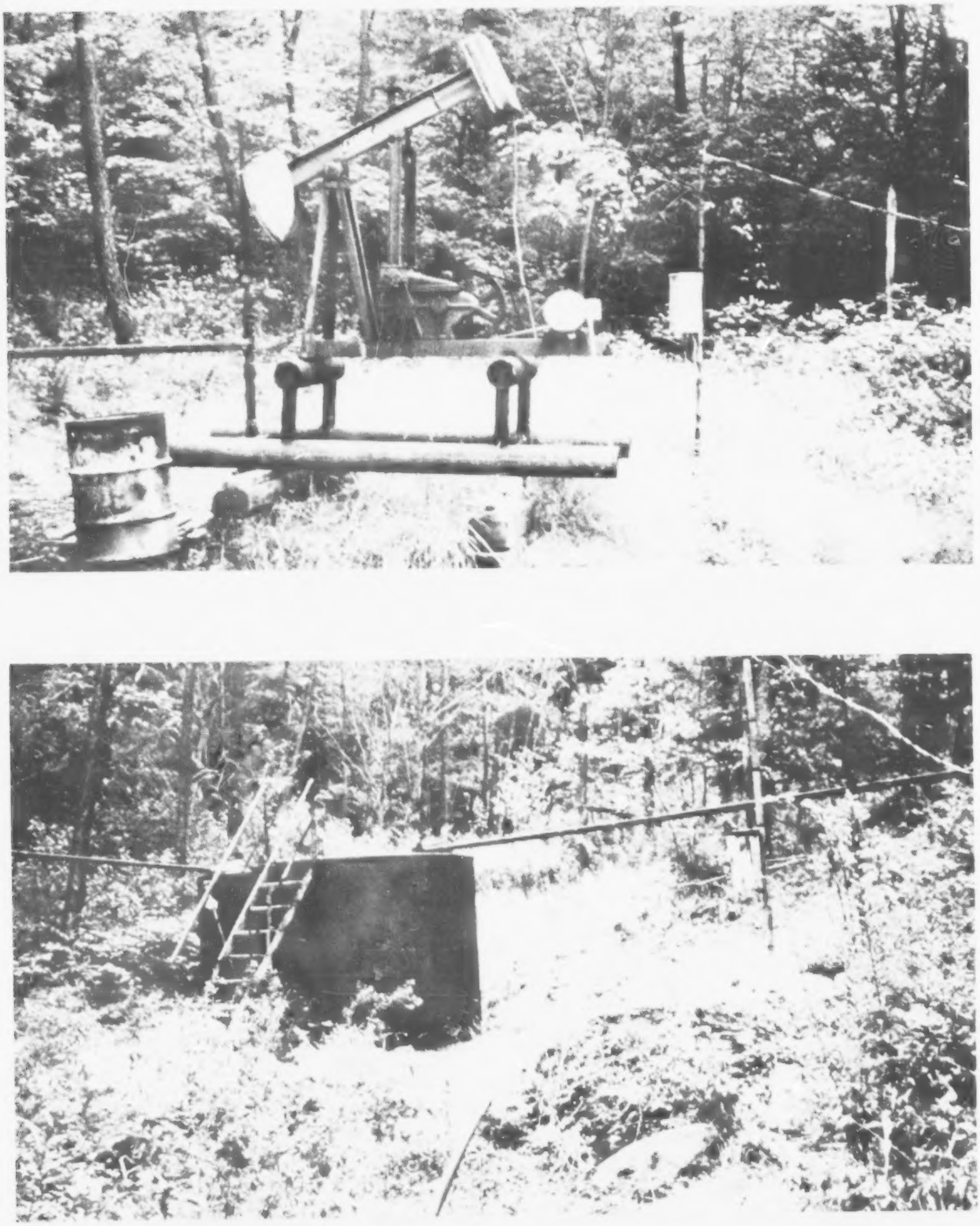
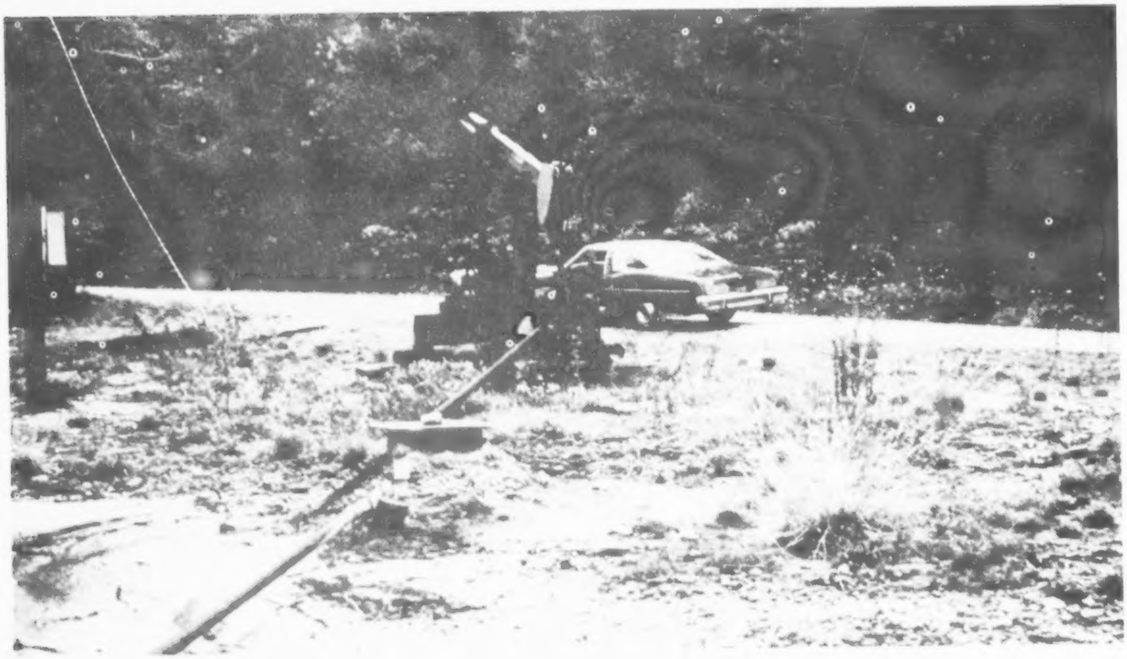


Figure 32 (c & d). Details (production well and storage tank) of multiple-well stripper facility in Pennsylvania (see Figure 30).



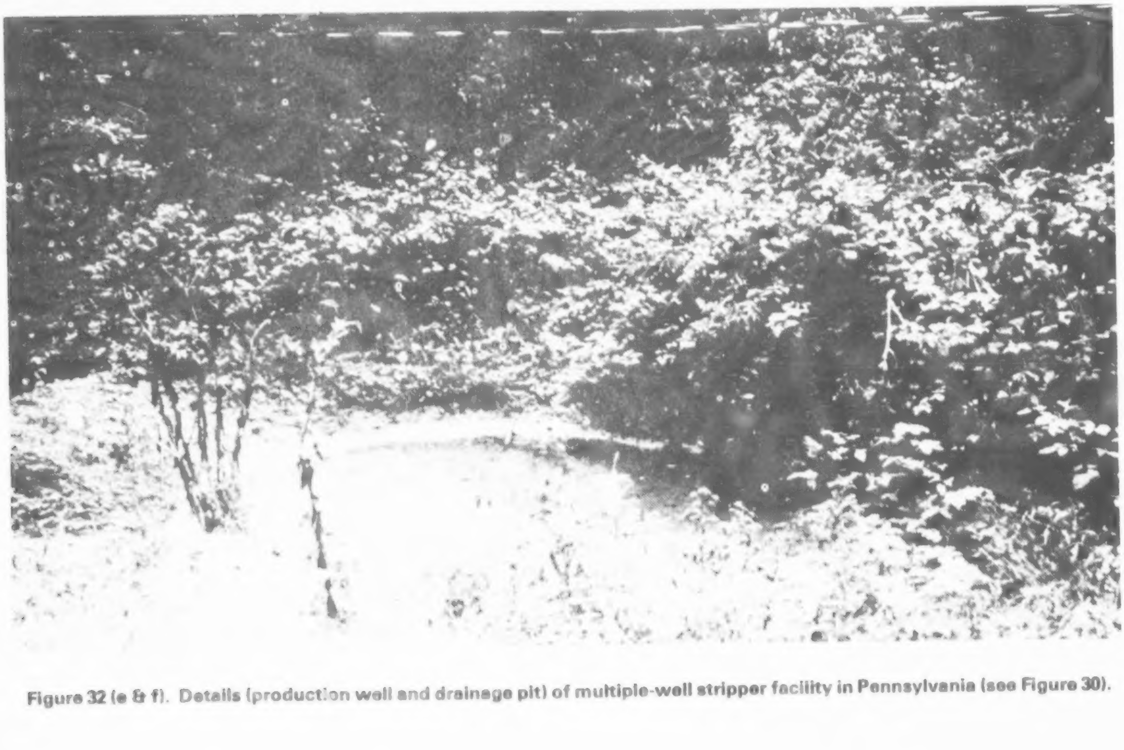


Figure 32 (e & f). Details (production well and drainage pit) of multiple-well stripper facility in Pennsylvania (see Figure 30).

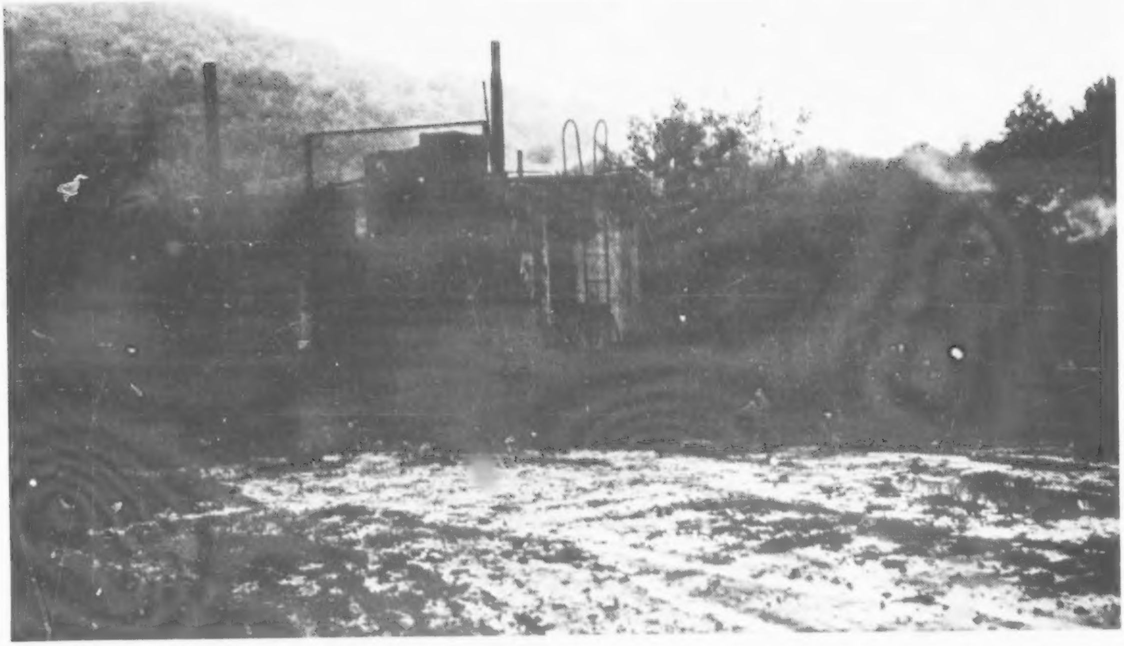


Figure 33 (a & b). Details (water knock-out at storage tank) of a 60-well stripper facility in Pennsylvania.

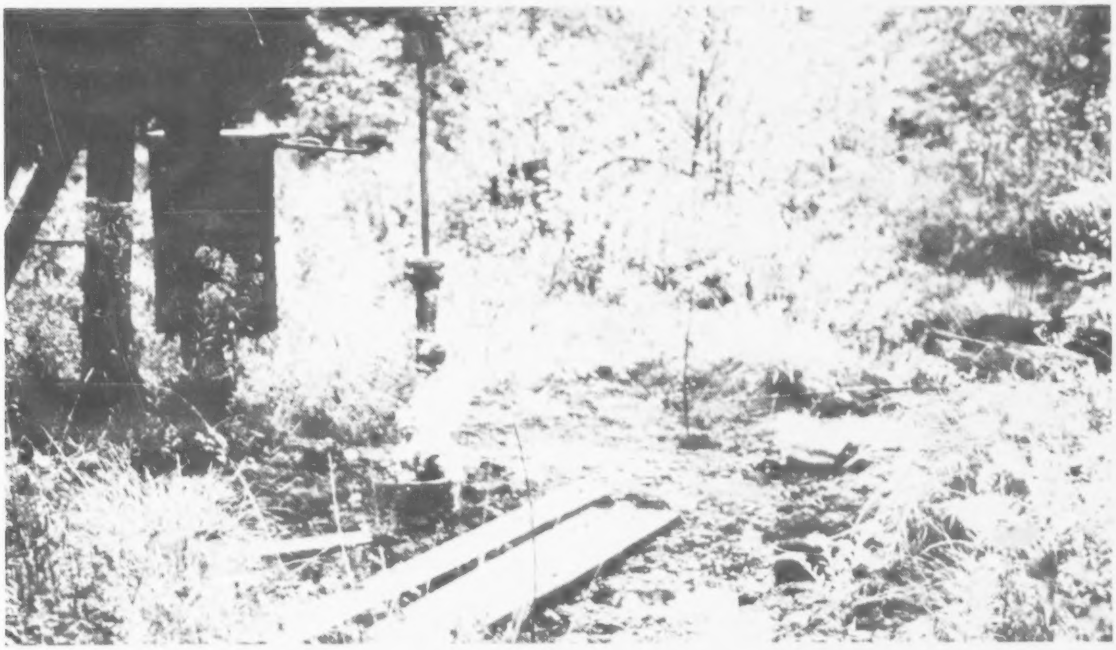


Figure 33 (c). Details (electrically operated well) of a 60-well stripper facility in Pennsylvania.

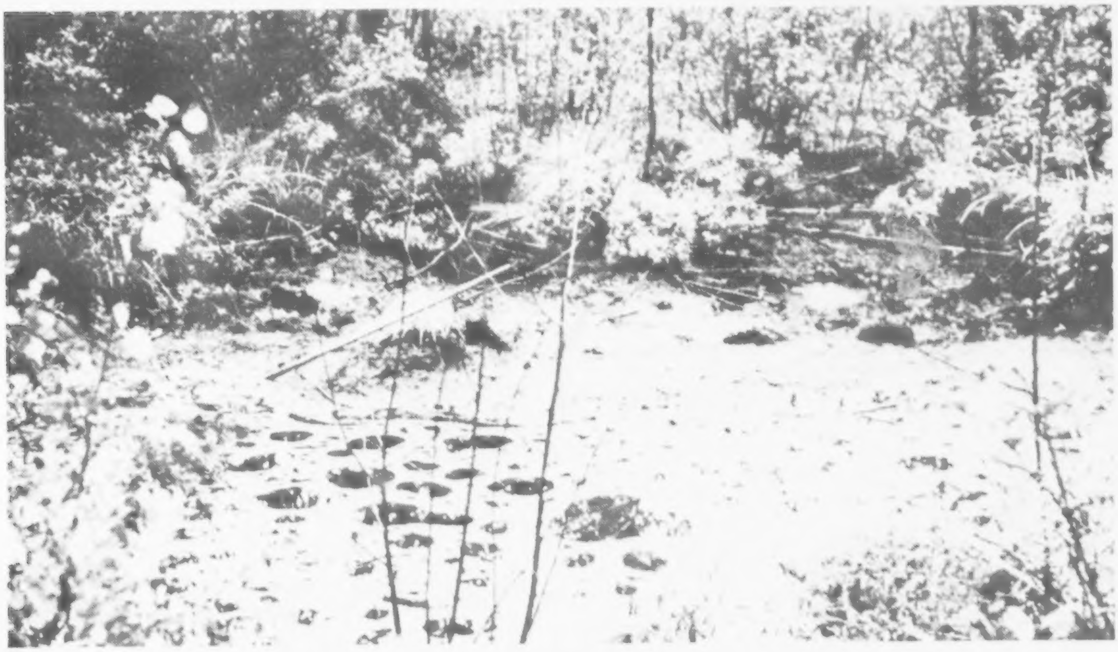


Figure 33 (d). Details (disposal pit) of a 60-well stripper facility in Pennsylvania.

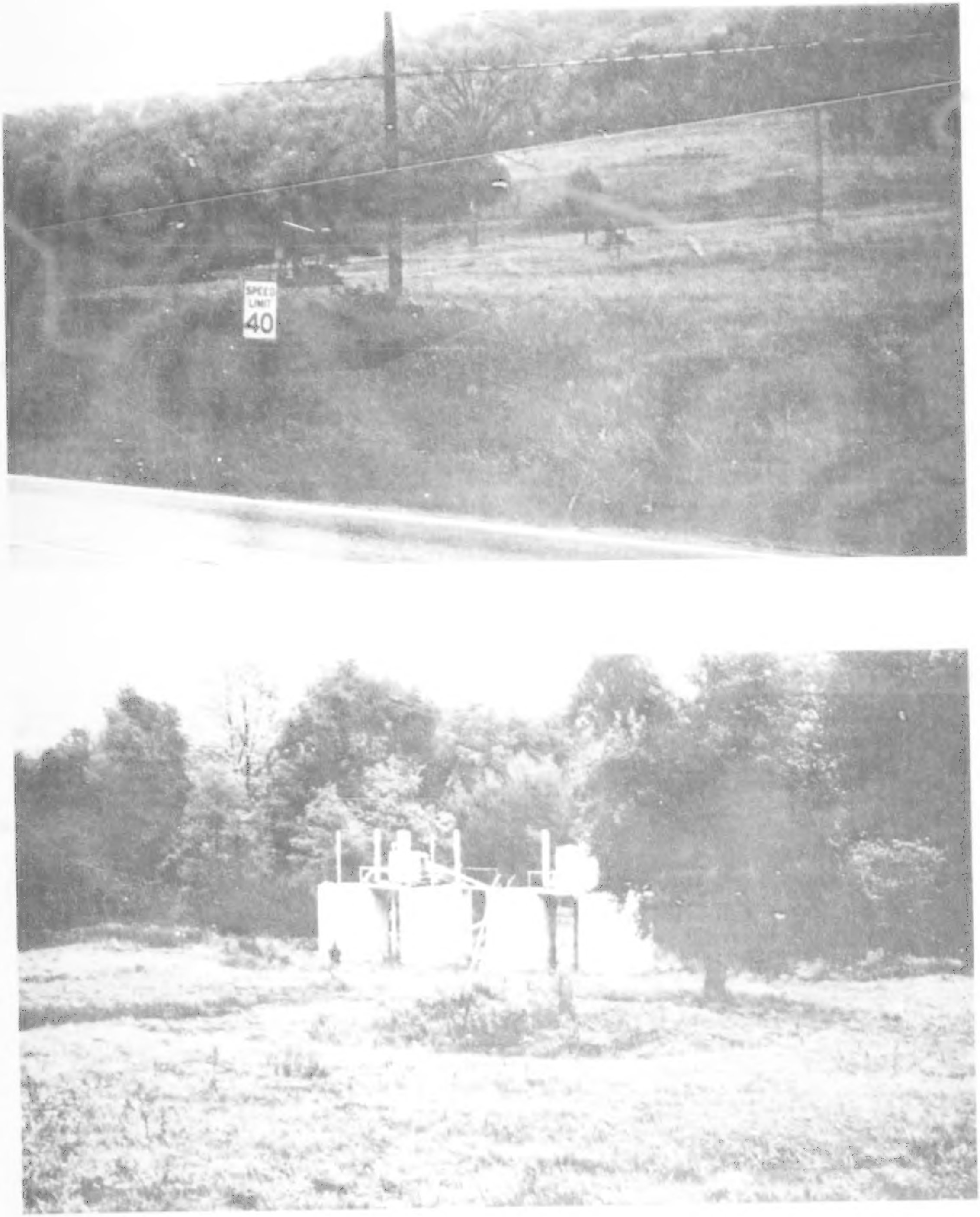


Figure 34 (a & b). Details (production wells and storage tanks) of a typical small off-highway/hillside production unit — Penn-Grade area.

time for an entire week may be 4 to 6 hours, which usually occurs in 15-minute time intervals several times a day. This intermittent operating mode leads to occasional pipeline plugging which is the source of many small leaks. Moreover, it also causes problems in the packing glands at the pump, which then must be replaced. These sources of leaks are frequent in the Penn-Grade area; however, they are minor because if undetected for a day, they will only result in 1 or 2 barrel spills at the maximum. Usually the total spillage from this source is much less.

Dikes around the oil storage tanks associated with the stripper wells are practically nonexistent for the "Ma and Pa" and small independent producers. The larger commercial operators such as Quaker State have constructed some dikes around their facilities, followed by pits.

The solutions to many of these technical problems involve the expenditure of funds for increased maintenance or the construction of adequate dikes or pits.

Discussion of Existing SPCC Plans

All of the SPCC plans reviewed during the survey were of the same basic format. One simple SPCC plan from each of the three states surveyed is shown in Appendix D. If these forms are properly filled out, they should represent adequate SPCC plans. However, it is worth noting that the Professional Engineers retained by the facility owners have not indicated that they were familiar with the requirements of 40 CFR Part 112. This latter statement is required as indicated in 40 CFR Part 112.3.d.

A number of the SPCC plans have stated that due to the smaller production, on a daily basis from these wells, the installation of containment structures for well heads and flow lines is uneconomical. Moreover, statements have appeared in several of the SPCC plans indicating that materials, manpower and equipment for control and clean-up are available in the event of a spill that threatens a waterway.

Recommended SPCC Plans

Two stripper-well facilities representative of the Penn-Grade area were chosen and SPCC plans prepared. The first facility produces 30 bpd of oil from a total of 17 wells — this situation is typical of a small independent operator in the Penn-Grade area. The second facility is of the "Ma and Pa" variety, with two wells producing about 1 bpd each. The recommended SPCC plans for these facilities appear in Appendix G.

Conclusions: Penn-Grade Stripper-Well Production Facilities in Area Visited

The following conclusions are based on observations, conversations and data taken during the survey:

1) The results of this survey support the conclusion that with the small and intermittent oil production from each of the facilities and in consideration of the difficulties of the terrain,

a very good job is being done to minimize the occurrence of spills. The small well-head and pipeline spills observed were confined to the immediate area surrounding the facilities and in most cases did not pose a threat to nearby water courses.

2) The pits and ditches used for containing water and spilled oil are generally adequate for the type of production operation that exists in the Penn-Grade area, however, they should be upgraded to meet the requirements of the Oil Pollution Prevention regulation, i.e., 40 CFR 112.7 (e) (2) ii. In almost all of the cases observed, the automatically siphoned fluid from these pits did not contain a significant quantity of oil. However, in a very few cases, some salt water was being siphoned from the ditches. This is not a serious problem now but could develop into one in the future.

3) Compliance with the Oil Pollution Prevention regulations is fairly good except in the cases of the "Ma and Pa" type of production operations. The reason for this situation is that these operators either do not know of the existence of the regulations or prefer to ignore them because they have not had spills in the past and are willing to run the risk of fines and/or operation shutdown in lieu of expending funds for environmental protection that *they* believe is unnecessary.

Description of Bulk Plant Facilities in the Penn-Grade Area

Eighteen bulk distributors were surveyed in detail in the Penn-Grade area. The layouts and locations were similar to those found in the New England area and are as follows: facilities in crowded city areas; those located in a valley between hills and in proximity to a stream; facilities located on a terrace between a hill and a water course; those located at the foot of a hill and adjacent to a highway or railroad, and facilities located on a bluff. These facilities are briefly described below.

Figure 35 is a plan drawing of a 75,000-gallon bulk marketing facility located in a valley between two hills and in the vicinity of a creek. Figure 36 gives different views of the facility showing its various features. At the time of the survey, a floating boom was planned for permanent installation in the creek in the event of a major spill from the facility.

Figure 37 presents views of a 41,000-gallon-capacity bulk distributor located on the terrace of a steep hillside. Figure 37 (a) shows the terrain and underground tanks which are filled from the top levels. A highway is located about 50 feet to the right of the facility, followed by steep hillsides. At the extreme left center of the picture is a railroad which parallels the highway. All of the drainage from this facility is toward the railroad, at which point the owner has plans for the construction of a retention wall. Figure 37 (b) shows the loading rack at the facility.

Figure 38 illustrates a 56,000-gallon bulk distributor which is located in a valley between two hills. Figure 38 (a) shows the storage tanks and

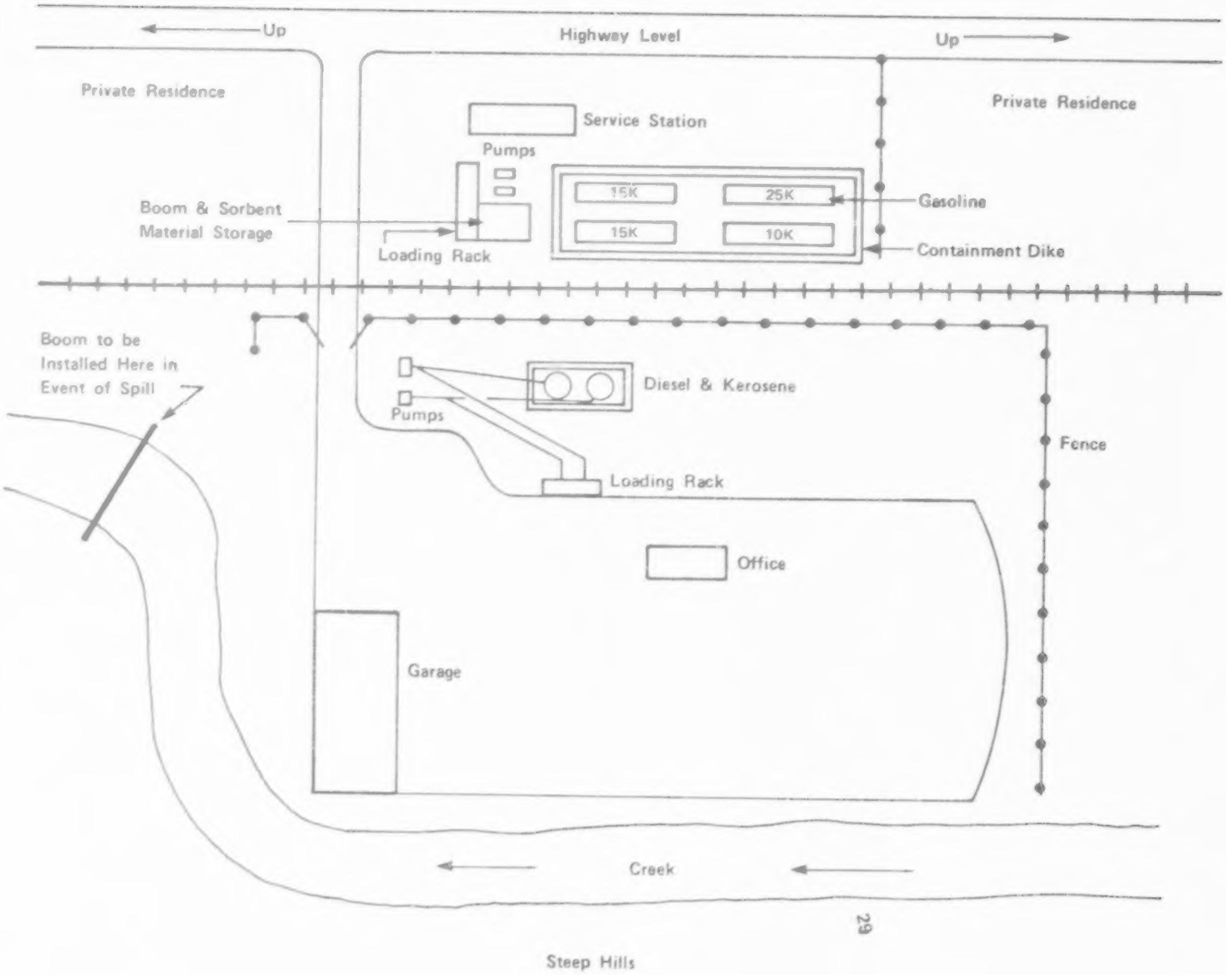
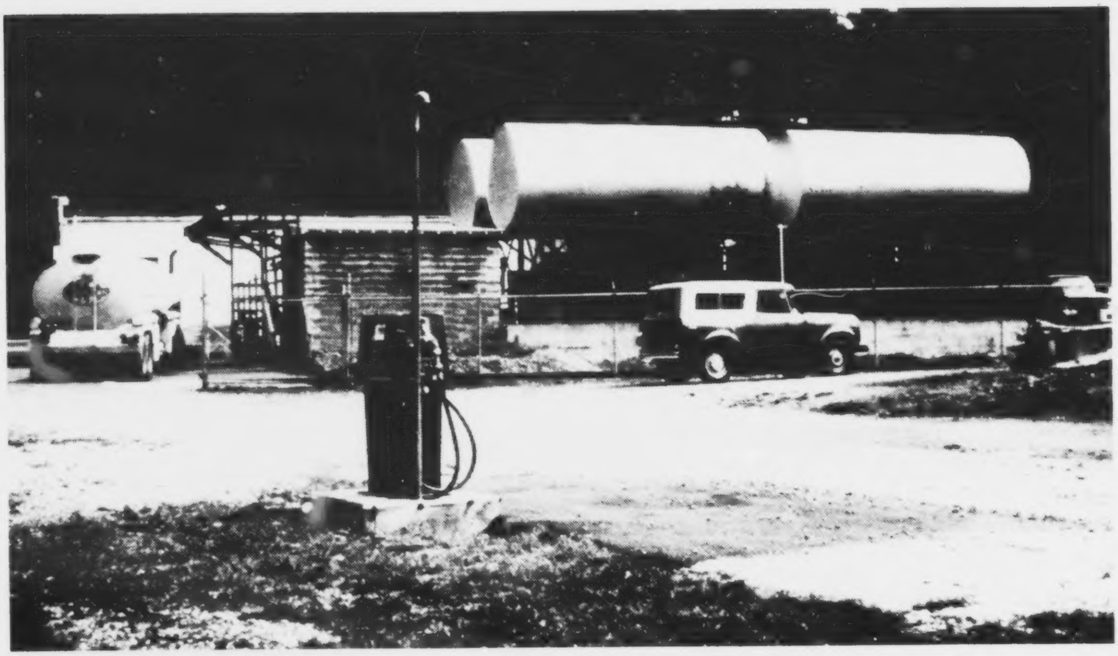

Up
Highway Level
Up
Private Residence
Service Station
Private Residence
Pumps
Boom & Sorbent
Material Storage
Loading Rack
15K
25K
15K
10K
Gasoline
Containment Dike
Boom to be
Installed Here in
Event of Spill
Diesel & Kerosene
Pumps
Fence
Loading Rack
Office
Garage
Creek
Steep Hills

Figure 35. Layout of a 75,000-gallon bulk plant—Penn-Grade area.



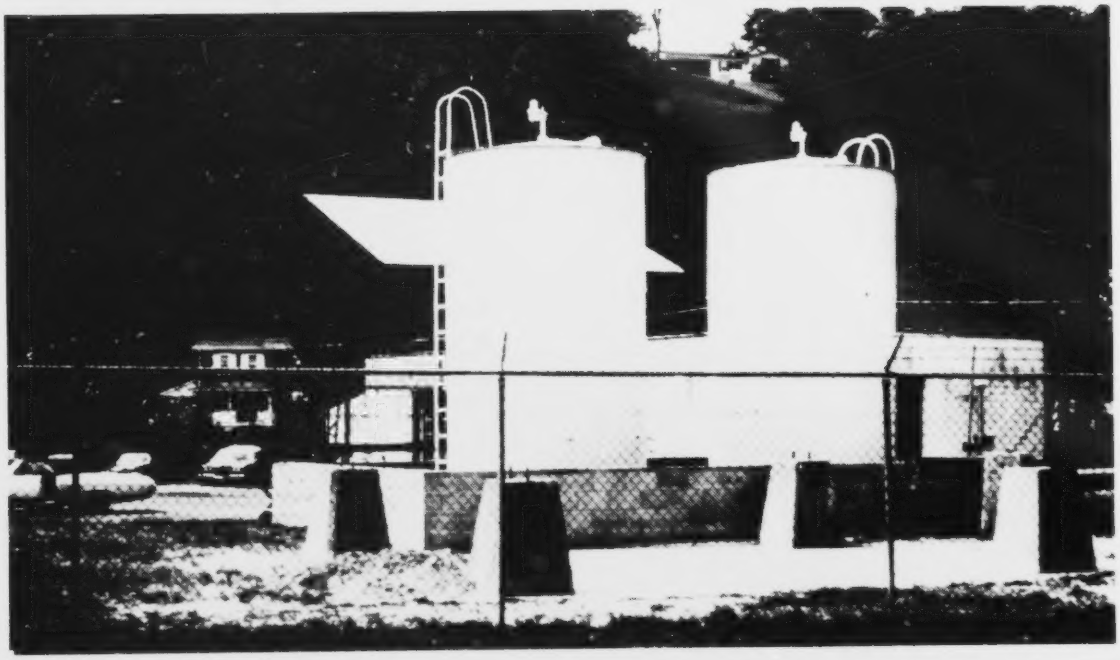


Figure 36 (a & b). Views of a 75,000-gallon bulk plant — Penn-Grade area.

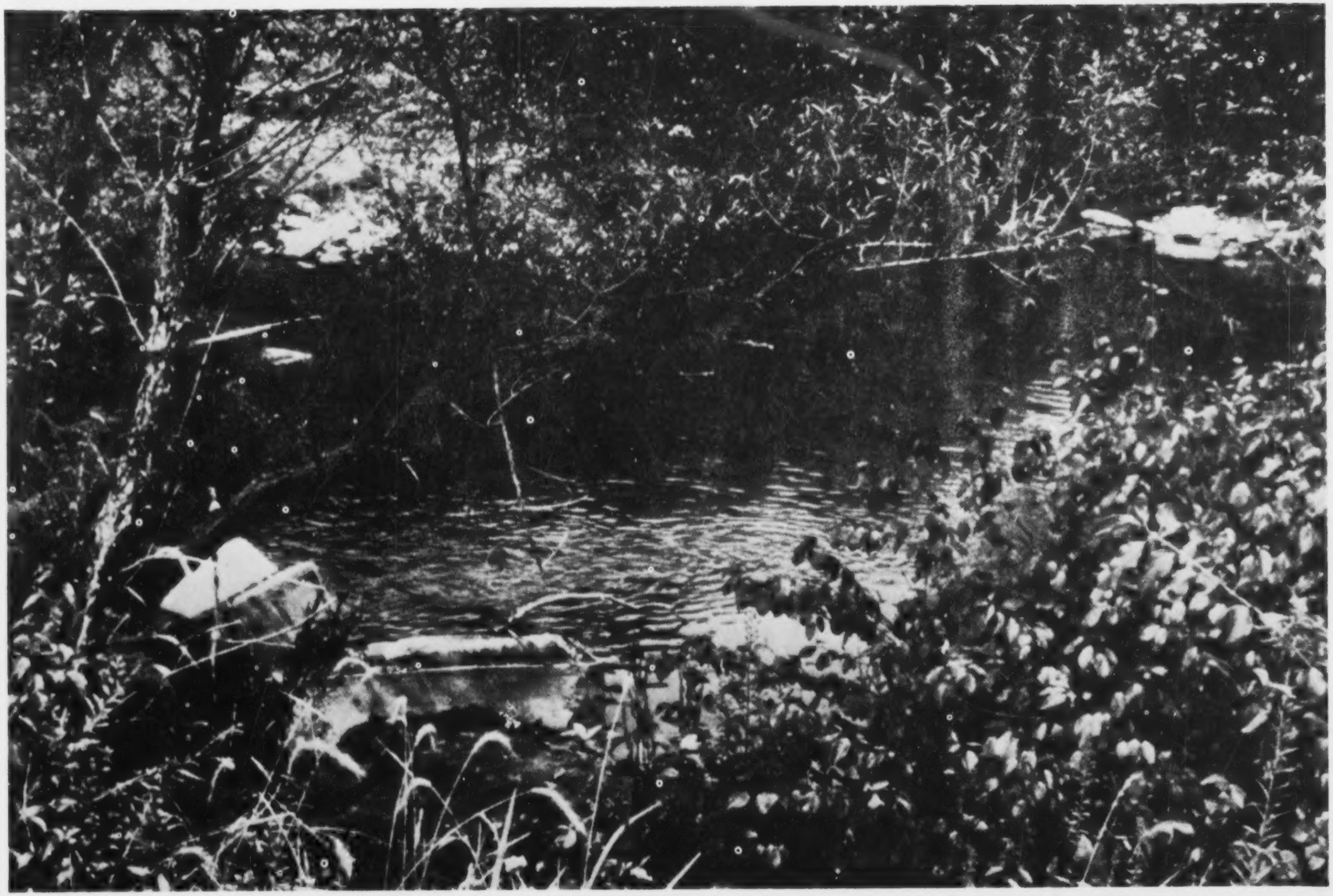


Figure 36 (c). Views (stream where boom is to be installed) of a 75,000-gallon bulk plant — Penn-Grade area.

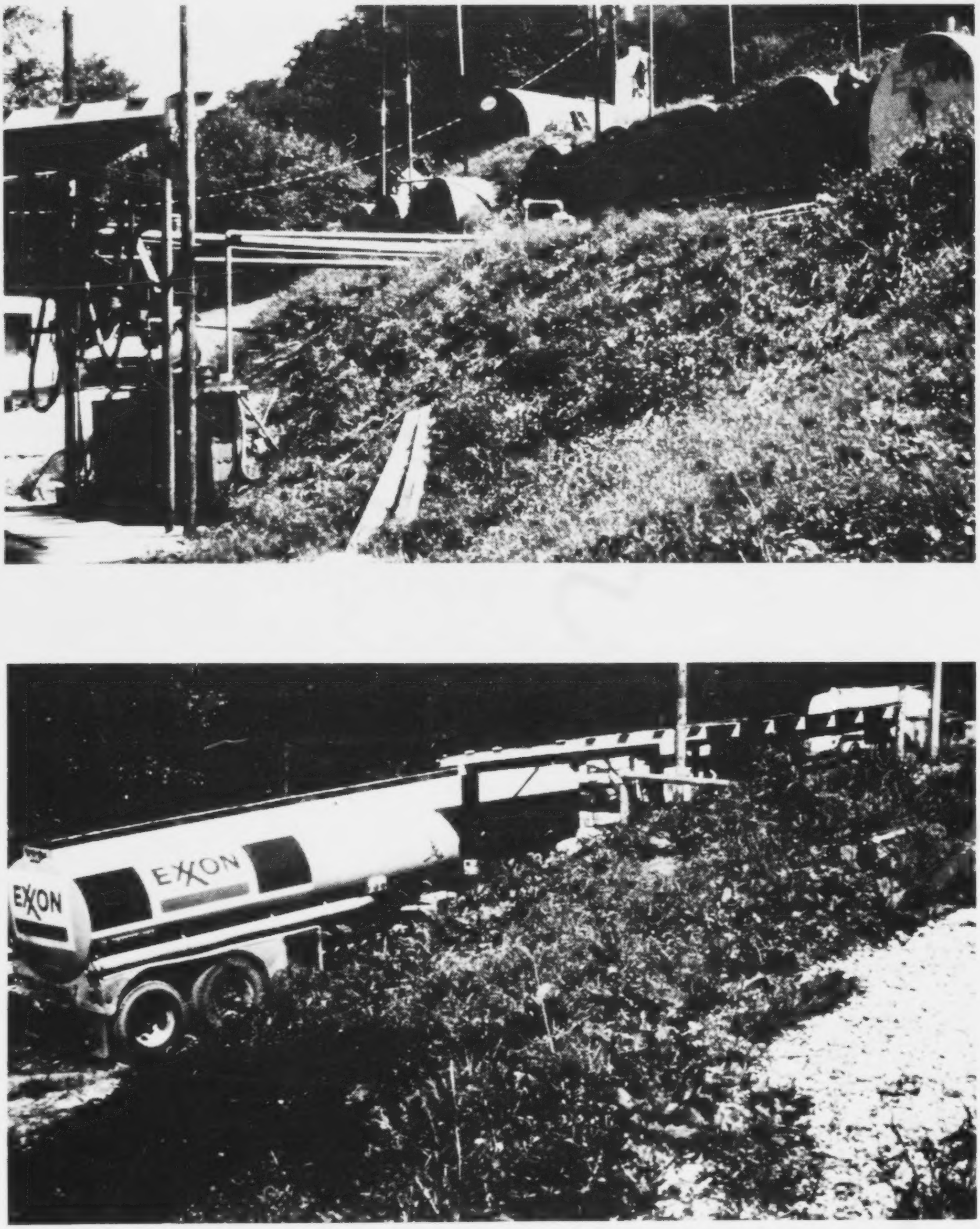
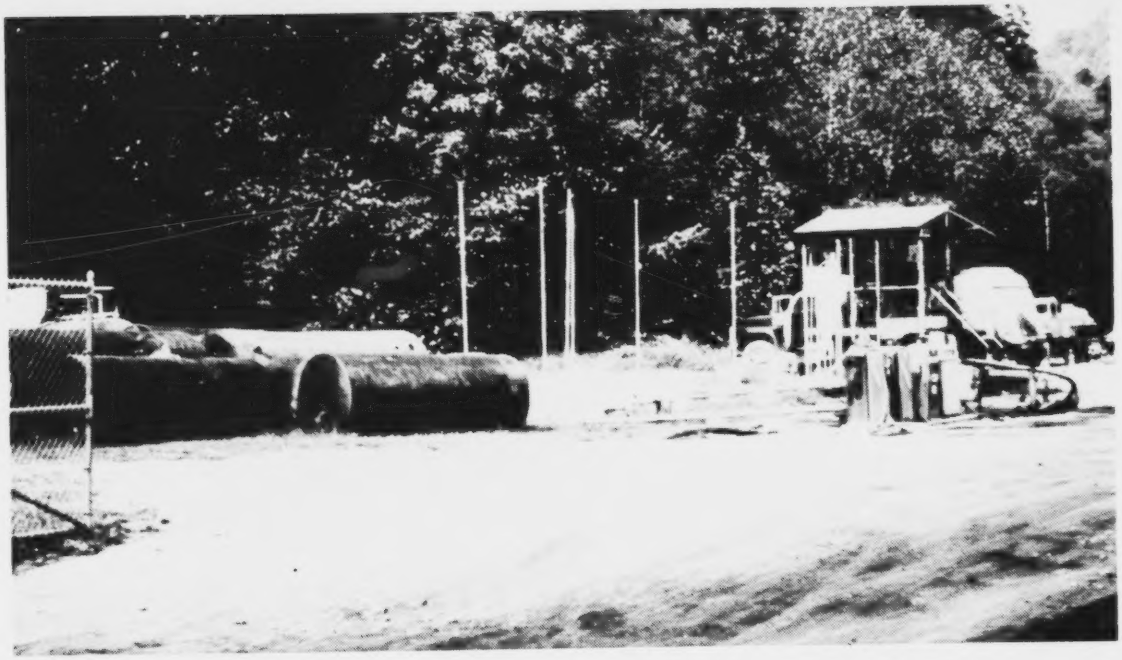

EXXON
EXXON

Figure 37 (a & b). A 41,000-gallon bulk plant on a steep hillside location-Penn-Grade area.



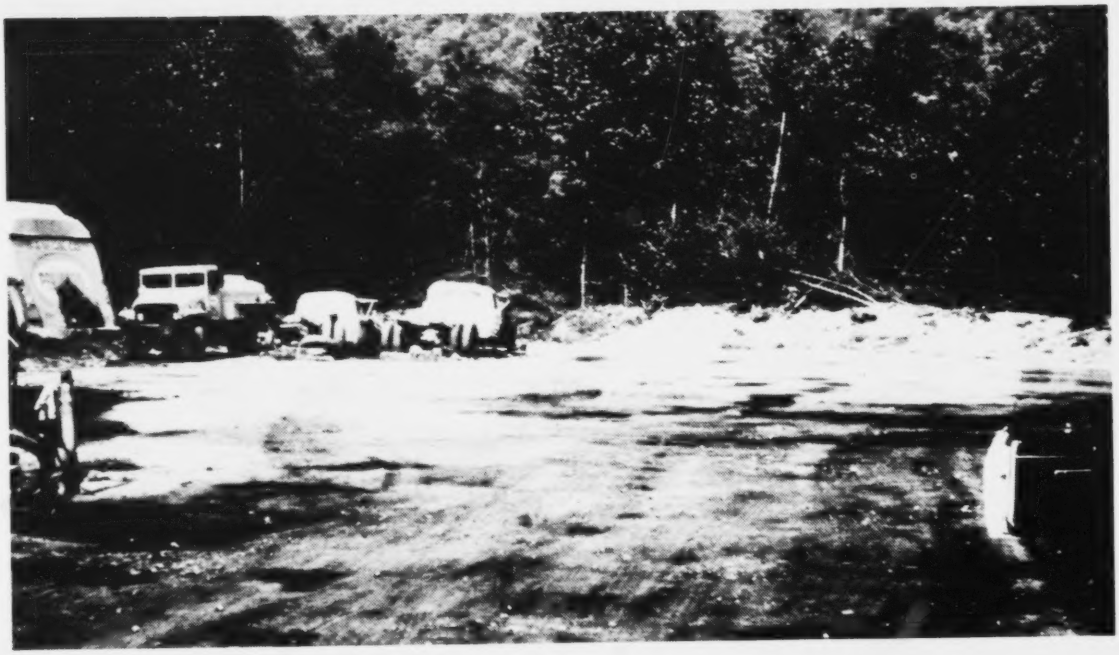


Figure 38 (a & b). A 56,000-gallon bulk station in a valley between two hills – Penn-Grade area (note earthen containment dikes at rear of both photographs).

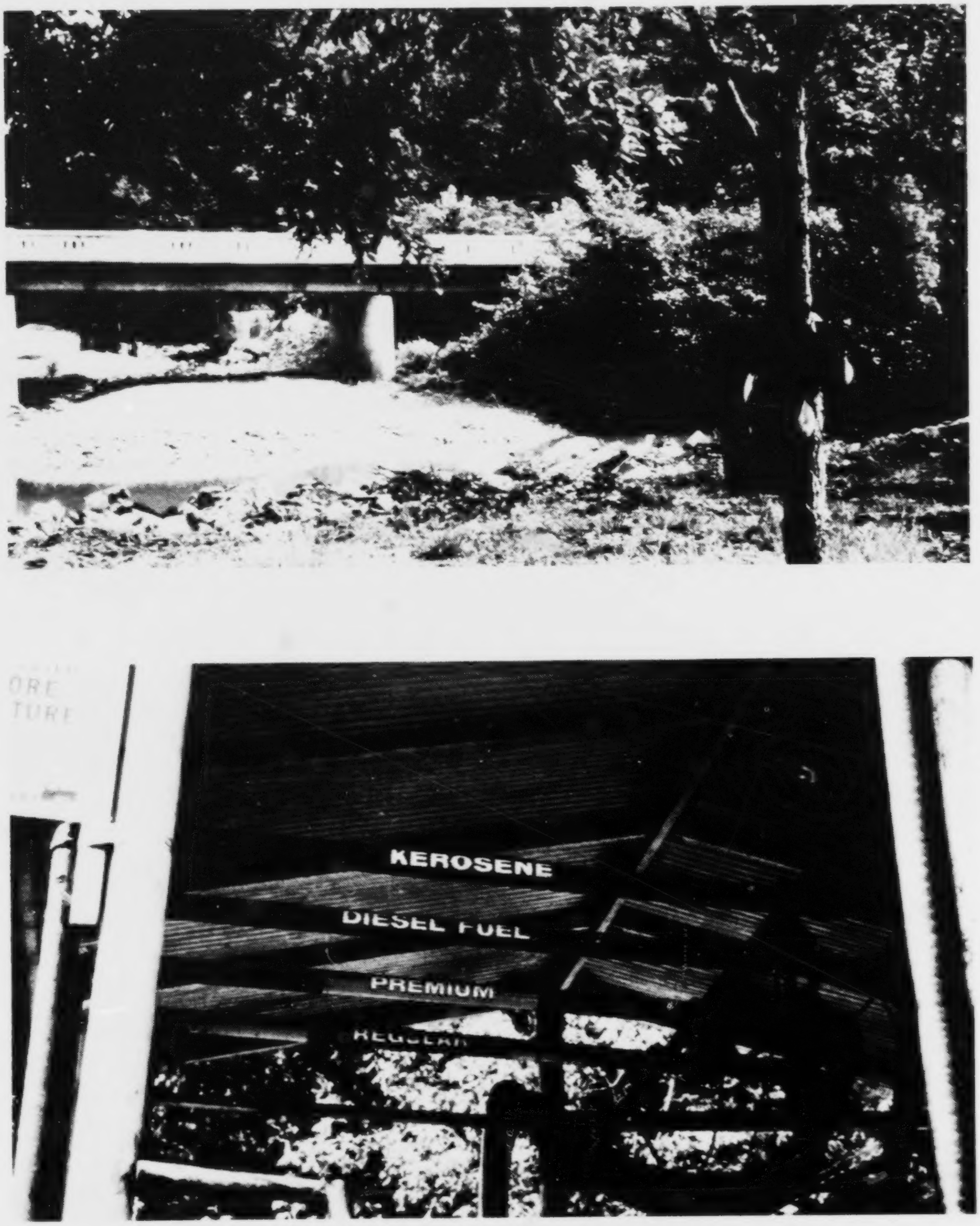

KEROSENE
DIESEL FUEL
PREMIUM
REGULAR

Figure 38 (c & d). A 56,000-gallon bulk plant in a valley between two hills — Penn-Grade area.

loading rack followed by hills; off to the right is a creek which precedes a railroad and a highway. Beyond the dike shown in Figure 38 (b) is a creek which turns to the left beyond the dike. The dike extends along the left side of the property line to turn water from the hillside to the creek. Figure 38 (c) shows the highway and railroad bridges to the right of the facility (Figure 38 (a)). The last, Figure 38 (d), shows the color coding of fuel lines at the facility.

The bulk distribution facility shown in Figure 39 is located in a crowded city area. Figures 39 (a) and (b) show the undiked tankage across the rear of the property. In Figure 39 (c), the loading rack and fencing along the right side of the property is shown. Figure 39 (d) shows the front of the property and the direction of the drainage to the rear of the facility. A spill from this facility would flow into a culvert located 150 yards away from the facility property line. The SPCC plan for this facility calls for a dam and clean-up ahead of this culvert. Dikes were not considered for this particular facility because the tanks are located practically on the property line.

Figure 40 (a) illustrates a bulk oil distribution plant having a capacity of 149,000 gallons. The facility is located on a bluff, from which a terrace was excavated and the tanks set in. On the open side of the terraced area, a dike has been constructed and is shown in Figure 40 (b).

In all of the facilities visited, almost 100 percent of them had adequate lighting, valves with locks and locked electrical controls. However, fencing surrounding the entire facility was absent in almost 4 out of 5 cases.

Technical Problems Encountered

The technical problems encountered at the bulk-storage facilities in the Penn-Grade area are listed below:

1) General maintenance of facilities was not quite as good as the housekeeping, and there was a need in some facilities for repair of leaking valves, and sandblasting and painting of corroded pipelines and vessels. This was covered in the facility SPCC plans but not followed up.

2) Many of the facilities were constructed in limited space with the property bordered by highways, railroads, rivers and occupied property on both sides. Also noted were V-shaped areas between highway and/or railroads and streams with occupied property at the open end of the V. Many of these facilities had natural dikes on one or more sides. An explosion or tank rupture in these small areas could cause oil spillage beyond the facility limits.

3) Security lighting and locked valves were generally adequate, but fencing was lacking in many cases. Fencing should be called for on all prepared SPCC plans.

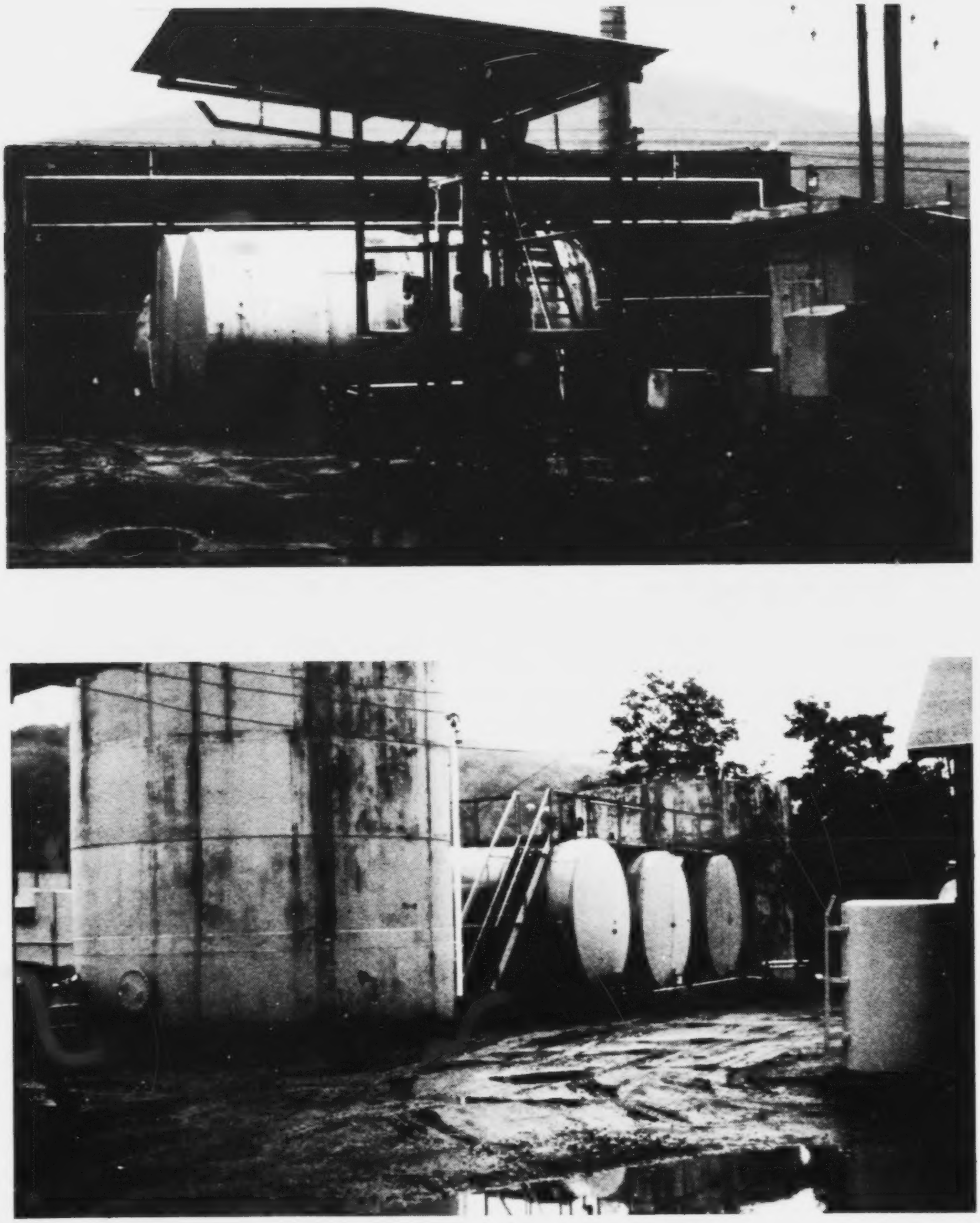
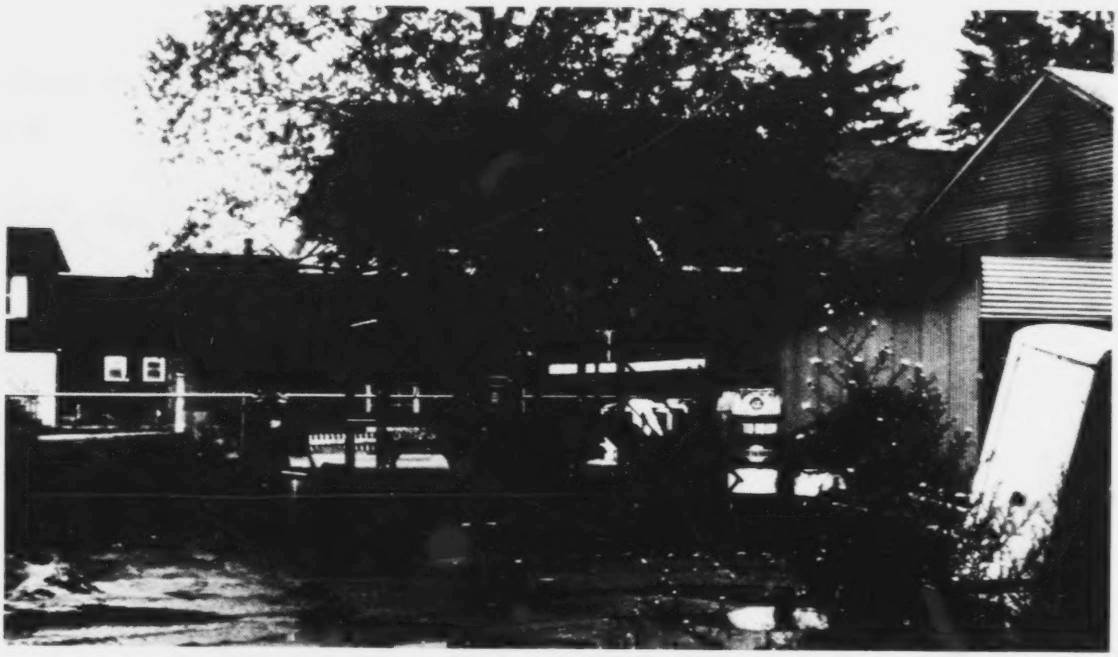


Figure 39 (a & b). Bulk plant in a congested city area — Penn-Grade area. This facility does not have any containment dikes around its tankage.



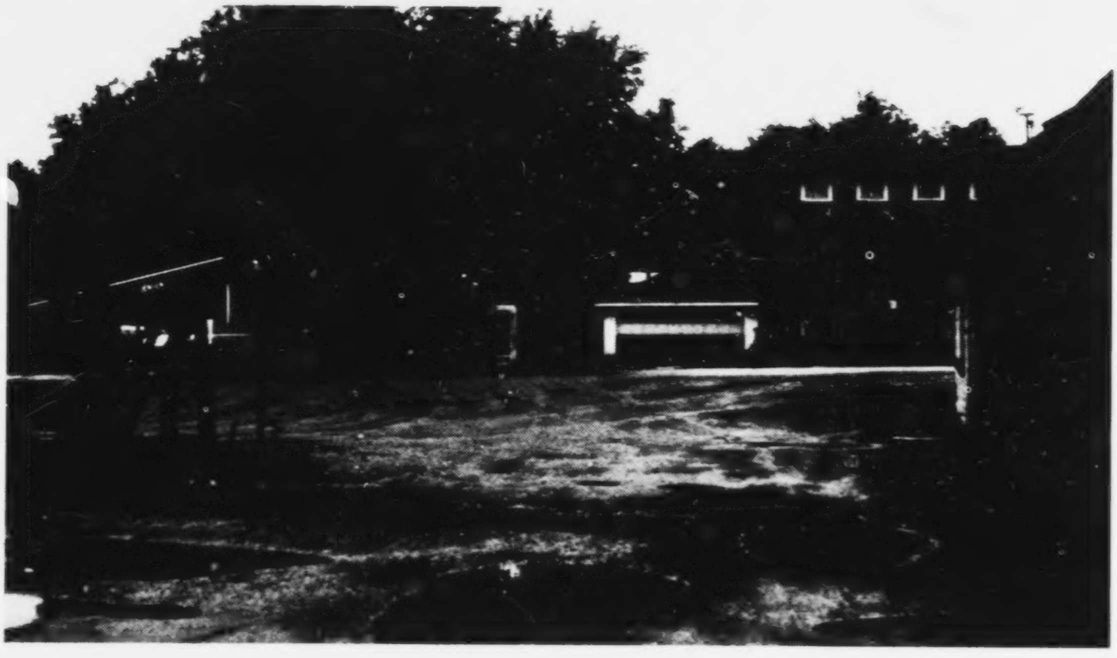


Figure 39 (c & d). Bulk plant in a congested city area — Penn-Grade area. Undiked area shown as well as drainage collection area for facility.

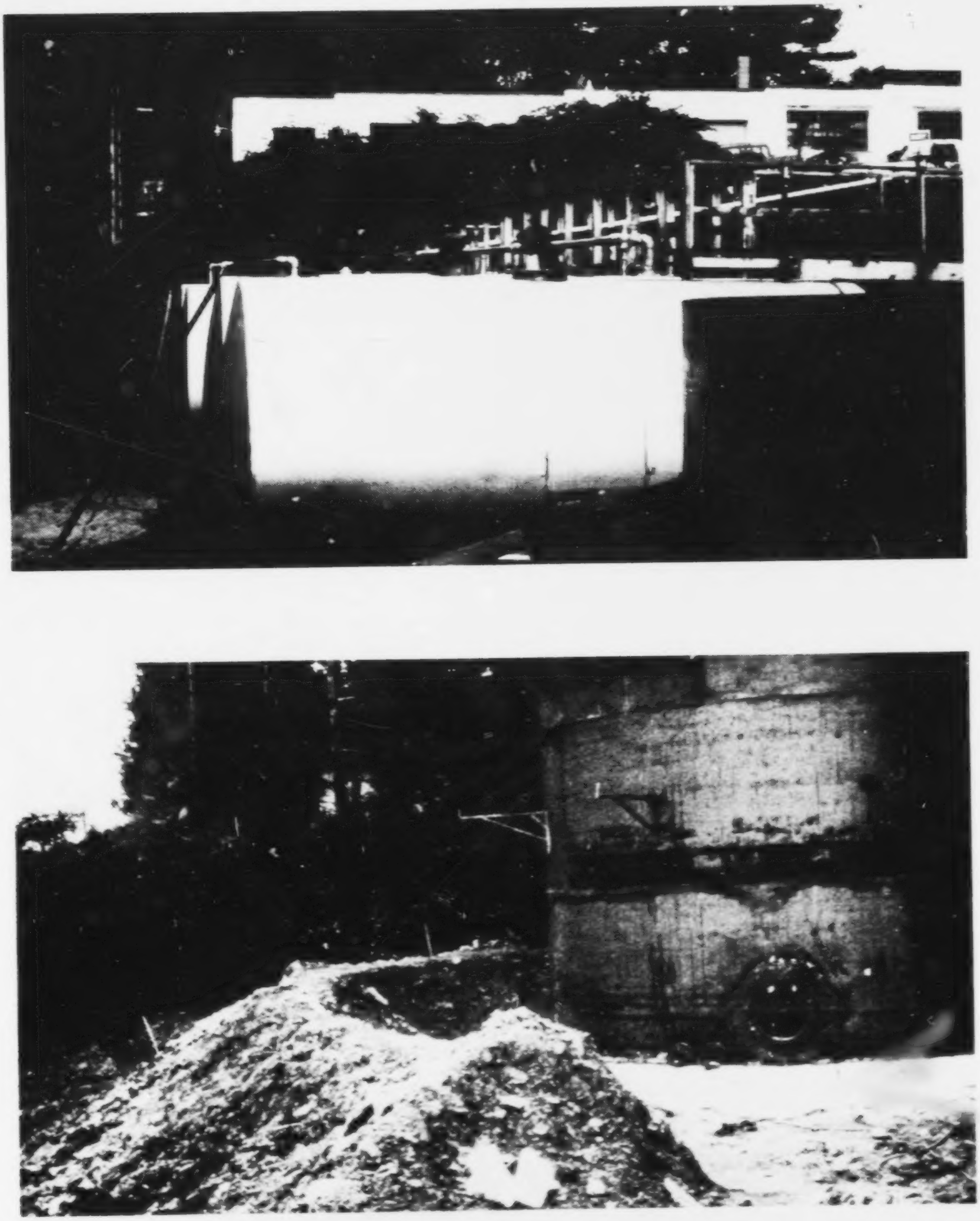


Figure 40 (a & b). A 149,000-gallon bulk plant located on a bluff — Penn-Grade area. Dike construction shown around a new tank installation.

4) For hillside locations, containment can be provided in most cases by dikes, earth or masonry, and natural barriers. One weakness noted in containment was at driveways where dikes are interrupted. A solution to this problem would be to continue the dike and provide ramps as required for truck access.

5) Loading on or adjacent to highways. In one facility the tanker truck parks in the street where spillage could follow the street drainage to the nearest catch basin. Although this is a small facility, there is sufficient area for tankers to pull into the facility and maneuver to a new unloading facility at the bottom of the street embankment. The second facility is small and all loading is adjacent to the street. A small concrete wall should be built along the edge of the property with ramps at either end for truck access and egress.

6) Color coding and labeling of lines and valves was lacking in many cases. It is recommended that this be done in all cases. This is not an expensive improvement and will certainly avoid unnecessary operational errors that can lead to spills as well as improving facility safety.

7) Transfer operations at bulk-loading facilities occur several times daily with a high probability of at least a small amount of spillage in connecting and disconnecting the transfer hoses. Provisions must be made to catch these small spills. The use of drip pans at the hose connections is an inexpensive way of avoiding these types of spills. Containment pits or concrete aprons with catch basins and sump drains must be provided in case of a premature truck departure; overfilling of tanks; leaky valves, connections, hoses and pipes.

Discussion of Existing SPCC Plans

Although existing SPCC plans were not obtained for these facilities, many of the sites surveyed had SPCC plans that, in general, were implemented.

Recommended SPCC Plans

The recommended SPCC plans for the Penn-Grade area survey of bulk plants are almost identical with those observed during the New England survey. Therefore, a discussion of these plans will be presented in the New England survey analysis section of this report.

Conclusions: Bulk Stations in the Penn-Grade Area

The following conclusions resulted from the survey:

1) The trade associations in the Penn-Grade area are very active in campaigning for the preparation of SPCC plans by their members.

2) Almost all of the distributors have prepared SPCC plans and implemented them.

3) No spills have been experienced at any of the facilities visited.

4) As in most of the other areas, especially with the very small bulk distributors, protection against a tank rupture resulting in the spilling of the entire contents of the storage vessel has not been accounted for in the implemented SPCC plans. This latter situation is inconsistent with the guidelines section of the Oil Spill Prevention regulation (40 CFR 112.7 (e) 2 ii).

5) No drainage records from these facilities are being kept at the present time.

6) In the preparation of SPCC plans, Registered Professional Engineers are concentrating on spill containment only and by the nature of the plans resulting are probably unfamiliar with the other provisions of the regulations, especially those dealing with truck loading, locked valves, fencing, electrical, etc.

7) Many of the distributors have spent between $600 and $1,500 for engineering services to prepare SPCC plans and from a few hundred up to $15,000 for facility improvements.

NEW ENGLAND AREA

Introduction and Summary

The objective of this portion of the study was to survey a representative sample of the bulk marketing-distribution industry in the New England area with the intent of determining the technical problems these facilities are experiencing in complying with 40 CFR Part 112, and to recommend a number of alternative solutions to these problems. These solutions will be in the form of generic SPCC plans for the various categories of facilities identified during the survey. During the New England area survey, two generic facilities were identified and SPCC plans prepared. The generic SPCC plans are presented in Appendix H.

The New England Survey area included the States of Maine, New Hampshire, Vermont, Massachusetts, Connecticut, and Rhode Island. The cities visited in each of these states were as follows:

Maine	New Hampshire	Vermont
Augusta	Portsmouth	Barre
Chisolm	Manchester	Springfield
Livermore Falls		

Massachusetts

Boston
Wellsley
South Weymouth
Avon
Hanover
Pembroke
Duxbury

Connecticut

Bridgeport

Rhode Island

Providence

A detailed map of the New England survey area is shown in Figure 41.

The type of facilities visited in this area were bulk oil marketing outlets, handling primarily #2 fuel oil for home heating. In some of the smaller towns, however, regular gasoline and kerosene were also available for farm use. The quantity of oil products stored at these facilities varied from as little as 50,000 gallons in the smaller inland towns to as much as 2,000,000 gallons in the larger cities along the coast. Specifically, the type of facilities visited were a papermill, 13 independent bulk plants, and 3 major oil company distribution outlets. There were also two basic types of facilities that were encountered during the survey. The first type of plant covered a very small area and was squeezed in between railroads, highways and adjoining properties. Examples of this type of facility can be seen in Figure 42. The second type of facility had an ample amount of land, but the terrain and drainage presented problems to the facility owner. Examples of this type of facility can be seen in Figure 43.

SPCC plans were available for review at each of the facilities surveyed. The plans did not follow any specific format and varied from a few pages in length for the smaller facilities to as much as twenty pages for the larger ones. Each of the plans reviewed included a detailed schematic drawing of the facility; however, in these plans there was no mention of security measures taken at the sites.

The spill experience in this area was found to be very good, with no spills in excess of 500 gallons reported, and these were infrequent. Most of the spills encountered were caused by personnel errors and were generally a result of overfilling a tank or associated with truck loading or unloading operations.

The economic impact of the regulations appears to be a very strong issue among the smaller independent bulk marketing dealers. As a direct result of this issue, many of the smaller dealers are just not complying with the regulations. On the other hand, the larger dealers are complying with the regulations.

Description of the Survey Area

Proceeding inland from the ocean, this region of the country progressively becomes more hilly and mountainous. The geology of this area is generally glacial till overlying metamorphic and intrusive rocks with frequent and irregular outcrops. A course stratified drift is predominant in the upper drainage systems whereas silt and clay deposits are generally found at the mouth

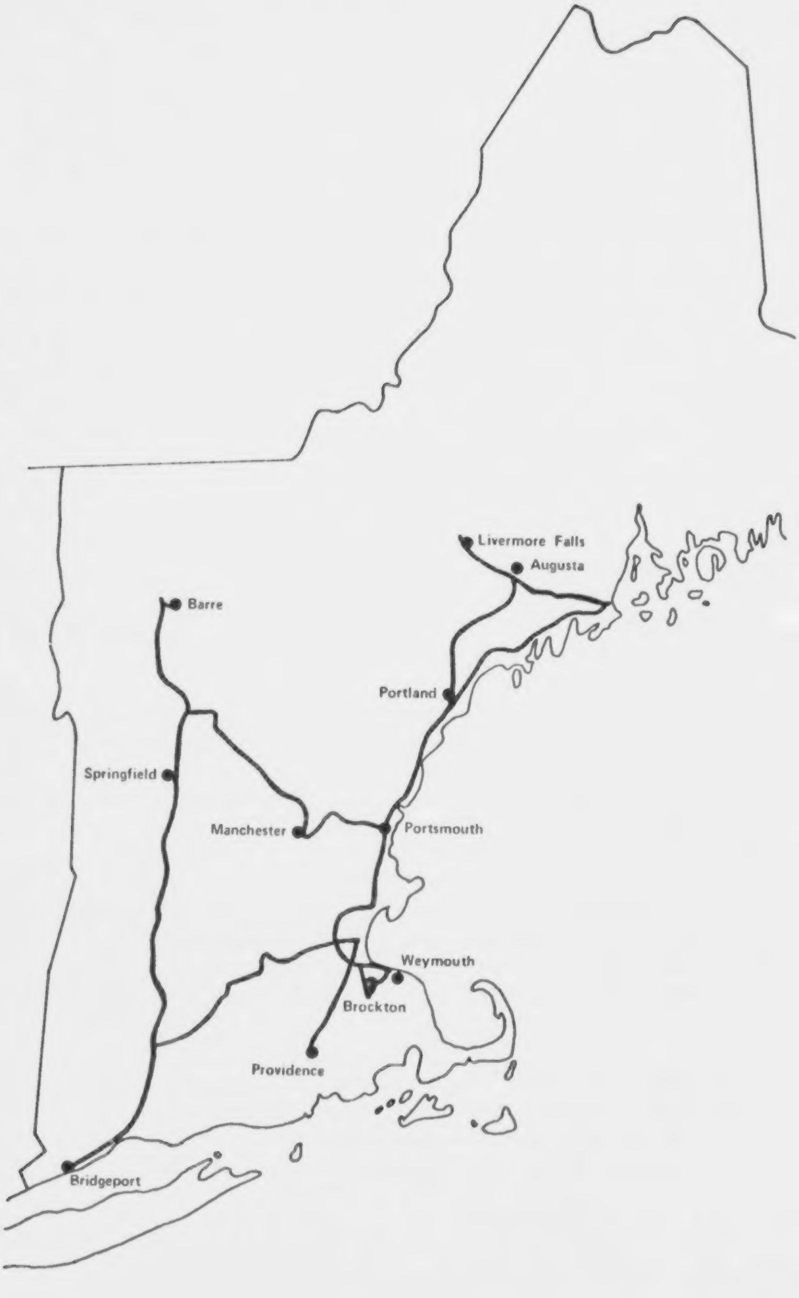

Livermore Falls
Augusta
Barre
Portland
Springfield
Manchester
Portsmouth
Weymouth
Brockton
Providence
Bridgeport

Figure 41. The New England survey area.

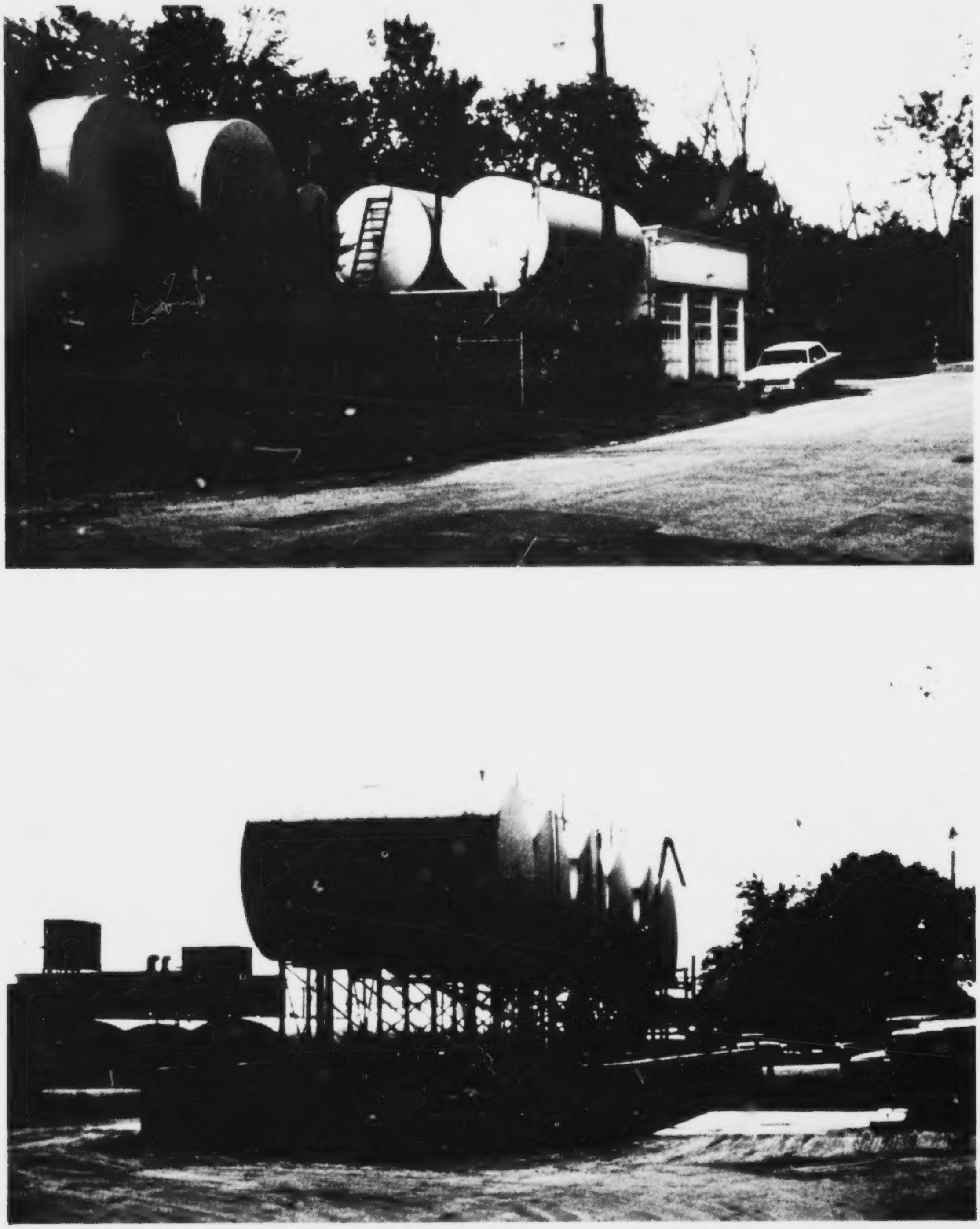
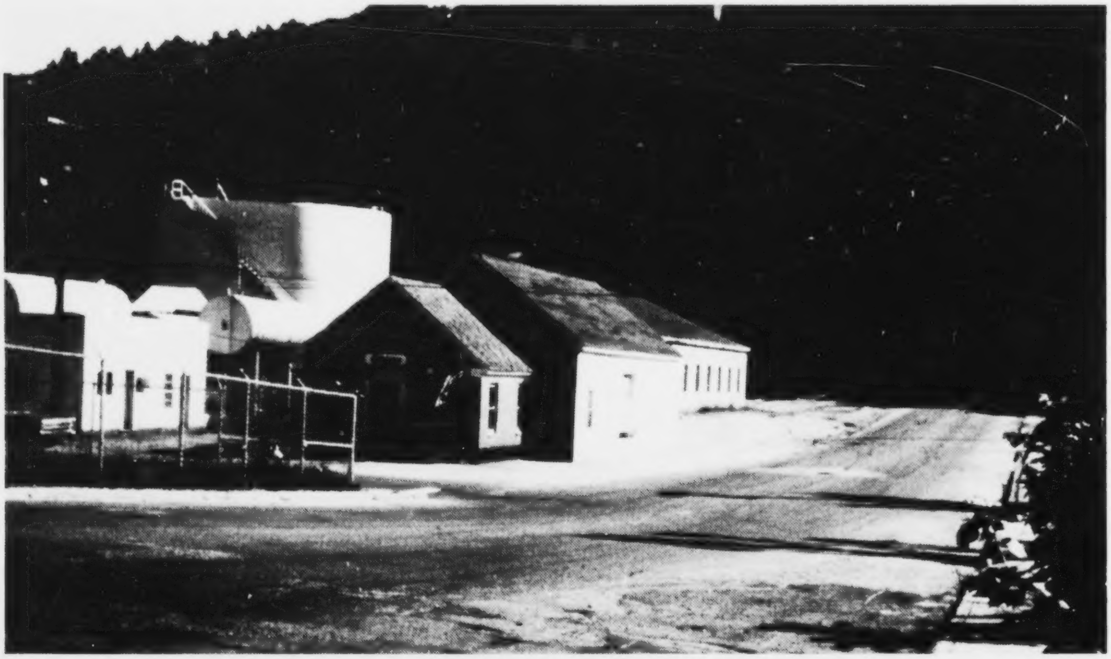


Figure 42 (a & b). Typical bulk plant on squeezed-in site — New England area.



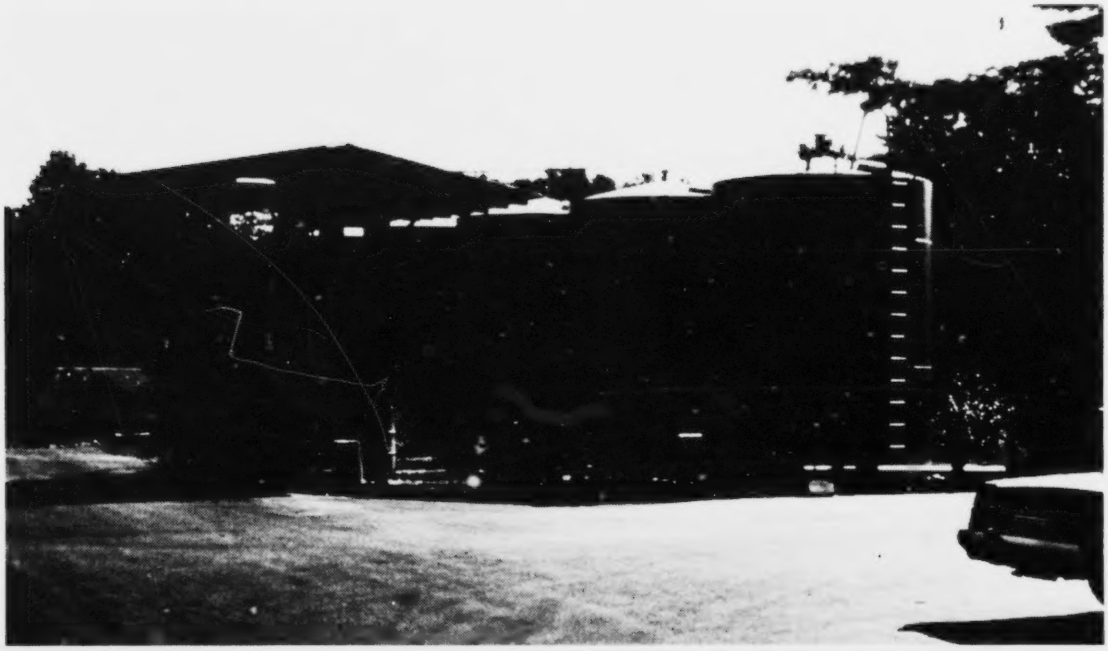


Figure 43 (a & b). Typical bulk plant with ample space, but with terrain and drainage problems — New England area.

of the rivers. In some areas along the Atlantic coast, coal ash and other industrial wastes were used for landfill. This activity resulted in making the soil extremely acid and unsuitable for underground storage tanks because of potential corrosion problems.

The vegetation in this region consists of numerous heavily wooded areas and some farmland. The climate is mild during the summer months, with average temperatures in the 68° to 70°F range whereas the winters are rather cold, with the average temperature in the 20° to 35°F range. The rainfall for this area varies from 30 to 45 inches per year.

Description of Facilities

The majority of the facilities visited during this survey were small independent fuel-oil distributors. In addition, one industrial plant and several fuel-oil distributors owned by the major oil companies were also visited. This section of the report is devoted to a discussion of those facilities and the measures being undertaken by them to comply with 40 CFR Part 112.

Industrial paper plant (New Hampshire) -- This plant, shown in Figure 44, was built during the early 1800s and is located on the east bank of the Kennebec River. The fuel oil storage for this facility consists of a new 50,000-gallon cathodically protected underground storage tank. The feed line from the tank runs on the ground over a steep bank and then under railroad tracks into the power house. At the top of the bank, where the fuel delivery trucks deliver the fuel oil, there is no protection against spills, thereby making the cemetary to the left of the tank vulnerable to spills. At the time of the survey, a small curb was being constructed and an area graded to flow to the left into a 4,000-gallon-capacity pit (this is the volume contained in one compartment of the tank truck). A concrete-lined trench will also be built under the entire length of the fuel feed line except where it passes under the railroad tracks -- in this area the pipe will be buried. On the other side of the tracks, a culvert will be constructed which leads into a concrete basement of an abandoned building -- this concrete basement is capable of holding 50,000 gallons of fuel oil (the capacity of the tank).

Small Independent Fuel Oil Distributor (Maine) -- In maine, two similar installations were found and Figure 45 depicts one of them. The highway that passes in front of the facility is 12 to 15 feet higher than the storage tanks, and in the rear of the facility is the Androscoggin River. On the side of the facility, the ground is higher at one end. In order to safeguard against spills, a dike has been built along the river side and extends around both sides to the tank battery. This dike has sufficient capacity to contain the contents of the largest tank. The lighting at this facility was very adequate and the entire property was fenced except for the entrance area. The loading rack, however, was separately fenced and under lock. Housekeeping at this facility appeared to be very good. The total fuel storage was 198,000 gallons, of which 32,000 gallons consisted of kerosene and the remainder was #2 fuel oil.

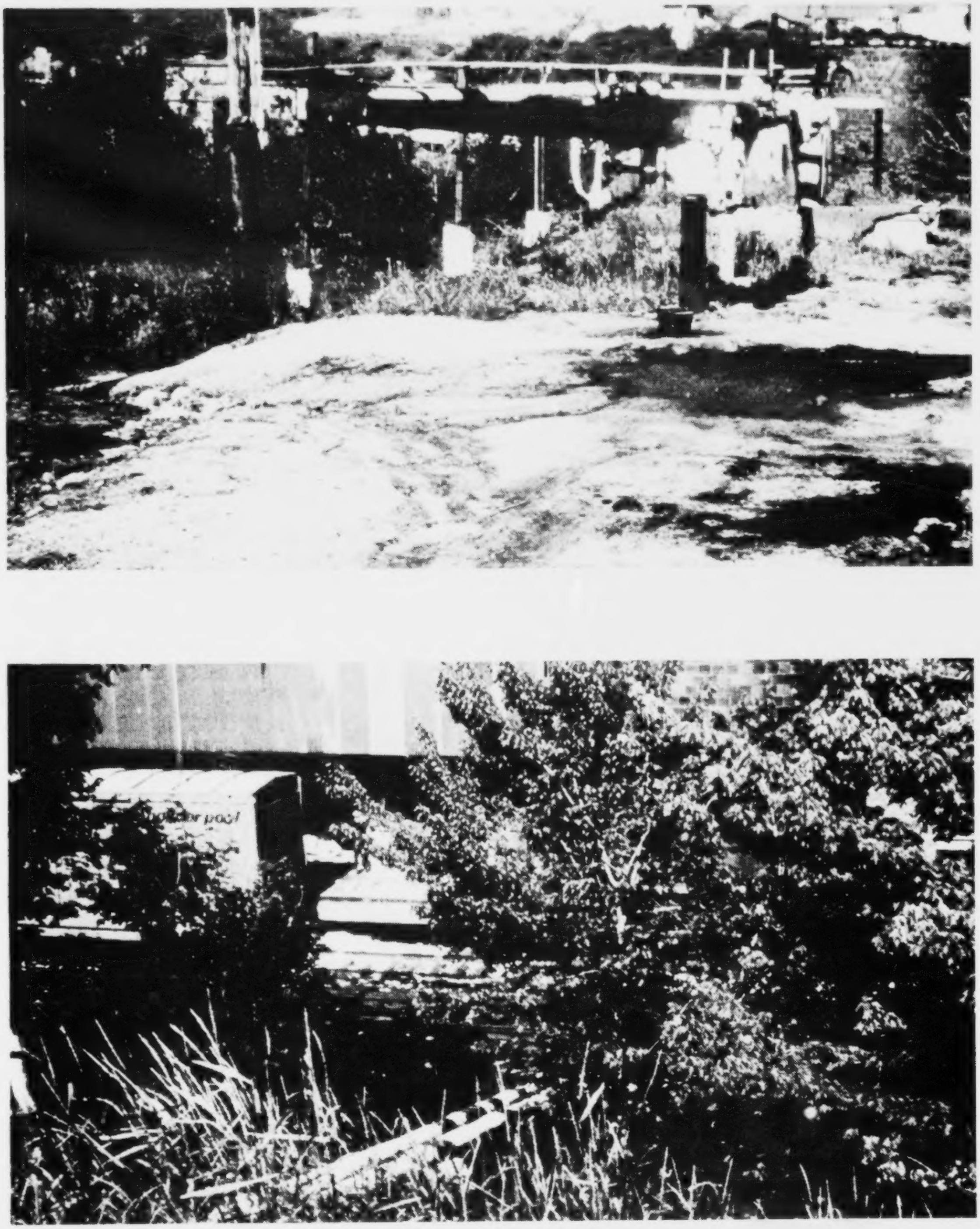


Figure 44 (a & b). Fuel oil unloading dock and piping at a New Hampshire paper mill.

Figure 45 (a & b). Small independent bulk plant in Maine.

Large Fuel Oil Distributor (New Hampshire) — This installation is located at the head of Portsmouth Harbor on the mouth of the Piscataqua River. The facility is surrounded by a street on one side and water on the other three sides. No diking presently exists at this facility. The installation presently handles only #2 fuel oil in four tanks: two 350,000-gallon, one 300,000-gallon and one 10,000 gallon.

This facility was not in business at the time of the survey, as far as storage was concerned, and was for sale. However, a good SPCC plan costing $2,000 had been prepared for this installation and the design changes are represented in Figure 46. The total estimated cost of implementing this plan was approximately $20,000.

When the facility was in operation, fuel oil deliveries were received by barge. At the time of the survey, however, the firm's delivery trucks were driving to a large terminal in Portland, Maine, to obtain the fuel oil at 1/2 cent/gallon cheaper than delivery by barge.

Large Fuel Oil Distributor (Connecticut) — This facility is located in Bridgeport Harbor on a short canal leading out from Long Island Sound. The site is illustrated by Figure 47. The storage capacity for this facility is 2,000,000 gallons of fuel oil. A drawing of its SPCC plan is shown by Figure 48. In complying with OSHA, NFPA, USCG, and EPA regulations, the facility owner stated that he was spending in excess of $140,000 to improve the installation. Up to the time of the survey, the following improvements had been made at this facility: Sandblasted and reworked all storage tanks, repaired or replaced all pipes and manifolds and color coded them, installed a foam system in case of fires, provided a boom around barges, installed high-level alarms, and provided sumps and curbs around truck-loading facilities. All of this work resulted in a considerable loss of sales because of the long shutdown times required to complete the work.

The entire area surrounding the facility is enclosed by a concrete wall which shows some weathering. It was planned that this wall would be repaired or replaced as required; however, work on this part of the project was to be delayed for a while, since it would require the loss of more operating time and thus sales.

Small Fuel Oil Distributor in the Center of Town (New Hampshire) — This facility was located on the main street of the town and was about 150 feet above the Merrimack River, which lies 3/4 of a mile east of the facility (see Figure 49). Directly under the facility lies a combined storm and sanitary sewer and a catch basin is located on the property (lower right in Figure 49). The fuel oil storage facilities consist of 11 horizontal 20,000-gallon tanks in two groups of 6 and 5 tanks, respectively. Each group of tanks is completely diked and has its own loading rack. The entire facility has been asphalted and is completely fenced for security.

The facility is bounded on two sides by streets, each having a locked gate entrance. The left side of the property is high and slopes about 5 feet to the other side where a concrete retaining wall has been constructed. Were it not for the city sewer line, any spill could easily be contained. The

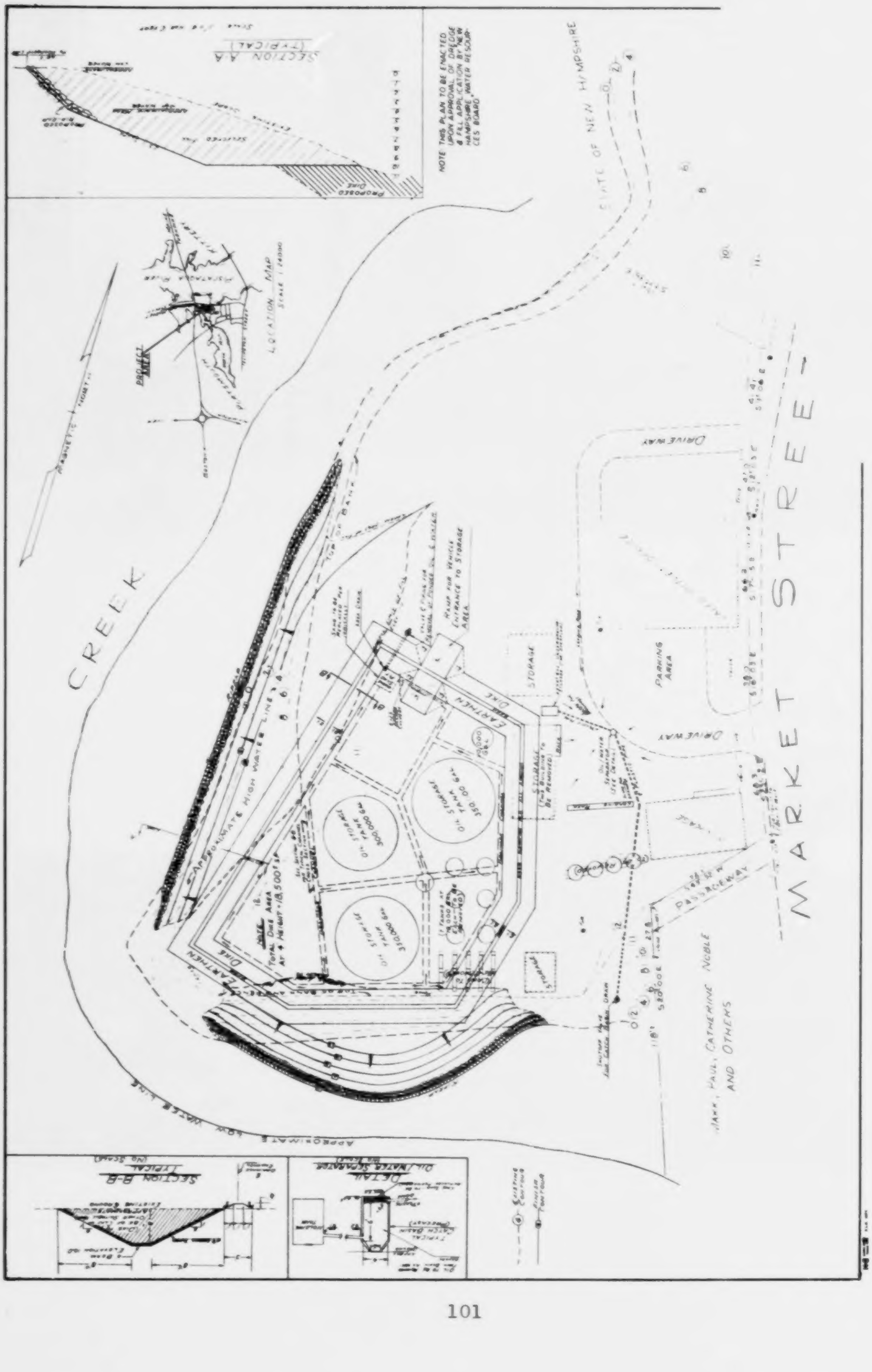

CREEK
MARKET STREET
STATE OF NEW HAMPSHIRE
PARKING AREA
DRIVEWAY
DRIVE WAY
PASSAGEWAY
STORAGE
EARTHEN DIKE
APPROXIMATE HIGH WATER LINE
APPROXIMATE LOW WATER LINE
OIL STORAGE TANK 30,000 GAL
MAGNETIC NORTH
LOCATION MAP
PROJECT SITE
SECTION A-A (TYPICAL)
SECTION B-B TYPICAL
DETAIL OIL/WATER SEPARATOR
NOTE THIS PLAN TO BE ENACTED UPON APPROVAL OF DREDGE & FILL APPLICATION BY THE NEW HAMPSHIRE WATER RESOURCES BOARD
JANE, PAUL, CATHERINE NOBLE AND OTHERS

Figure 46. SPCC plan layout for a large independent bulk plant in New Hampshire.

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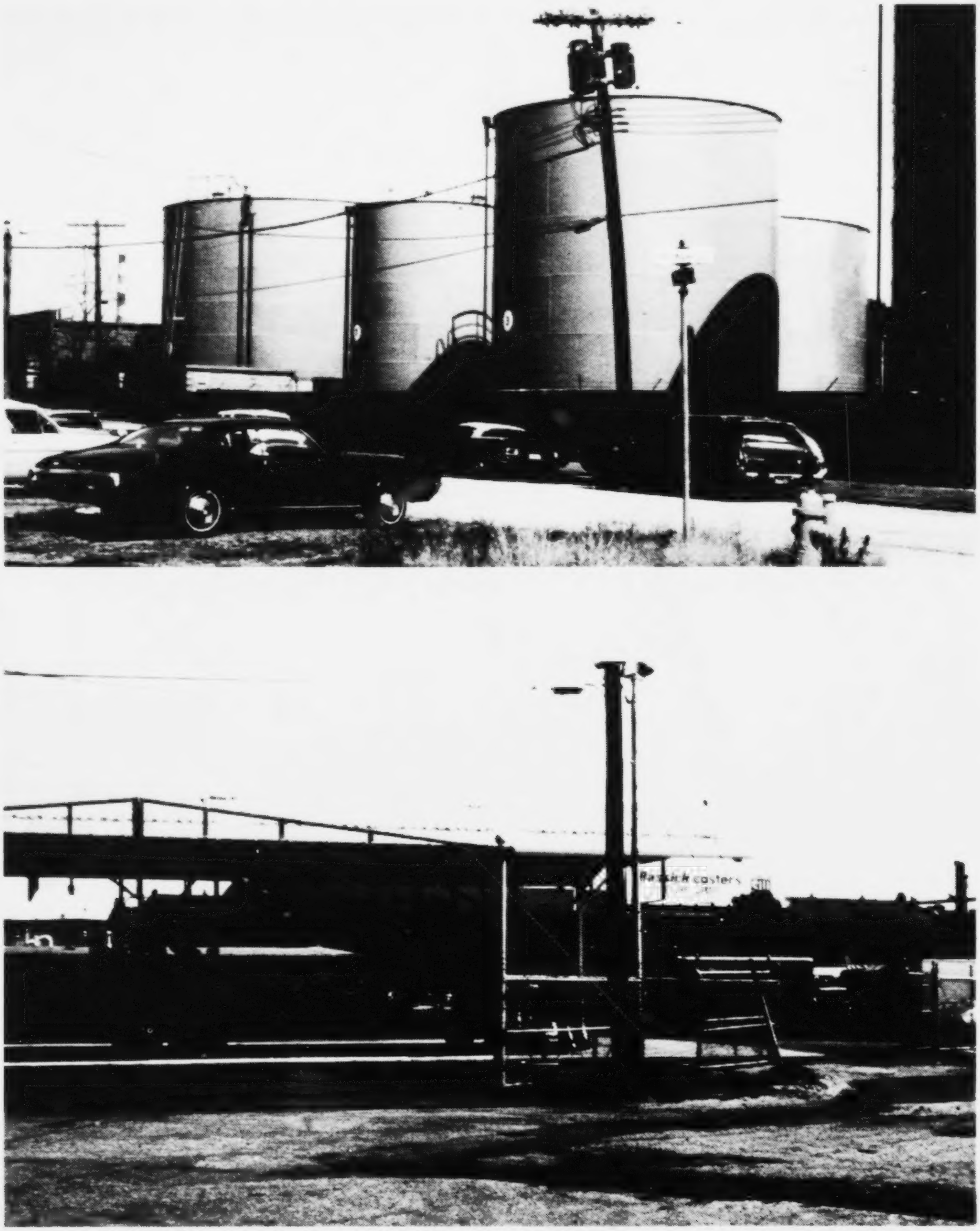

Figure 47 (a & b). Large bulk plant in Connecticut.

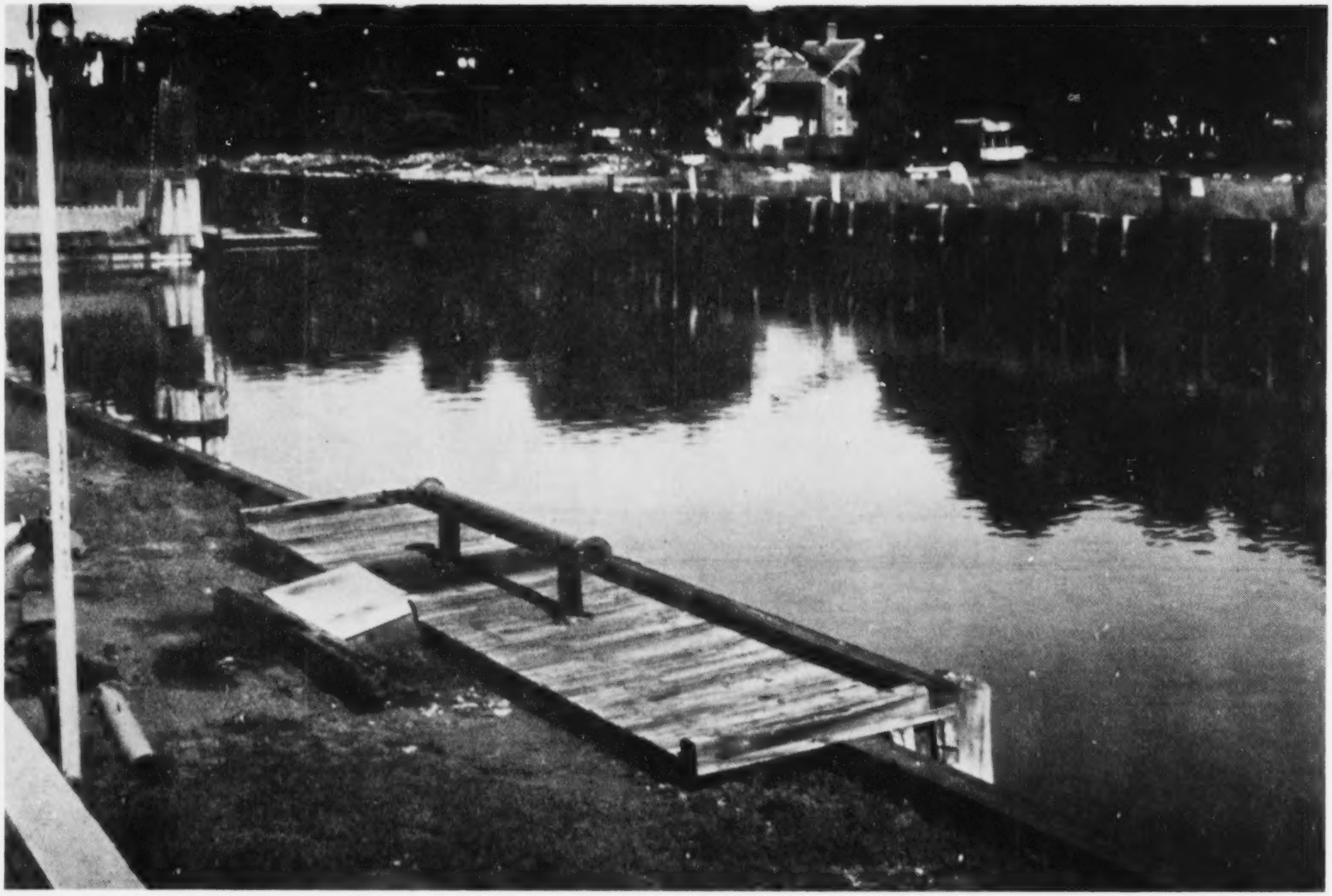

Figure 47 (c). Large bulk plant in Connecticut.

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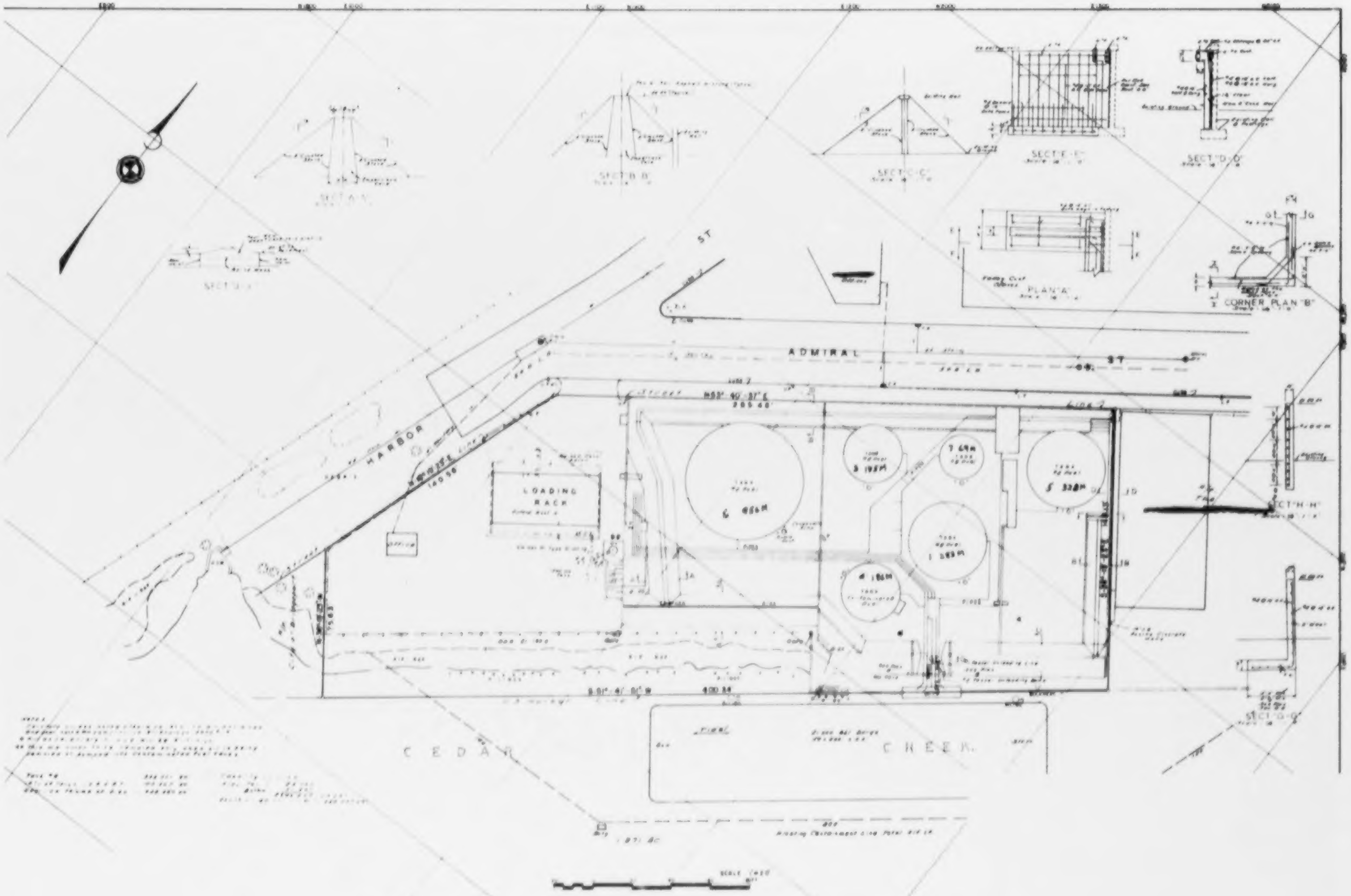

SECT "A-A"
SECT "B-B"
SECT "C-C"
SECT "E-E"
SECT "D-D"
PLAN "A"
CORNER PLAN "B"
ST
ADMIRAL
ST
HARBOR
LOADING
RACK
OFFICE
SECT "H-H"
SECT "G-G"
CEDAR
CREEK

Figure 48. SPCC plan layout for a large independent bulk plant in Connecticut.

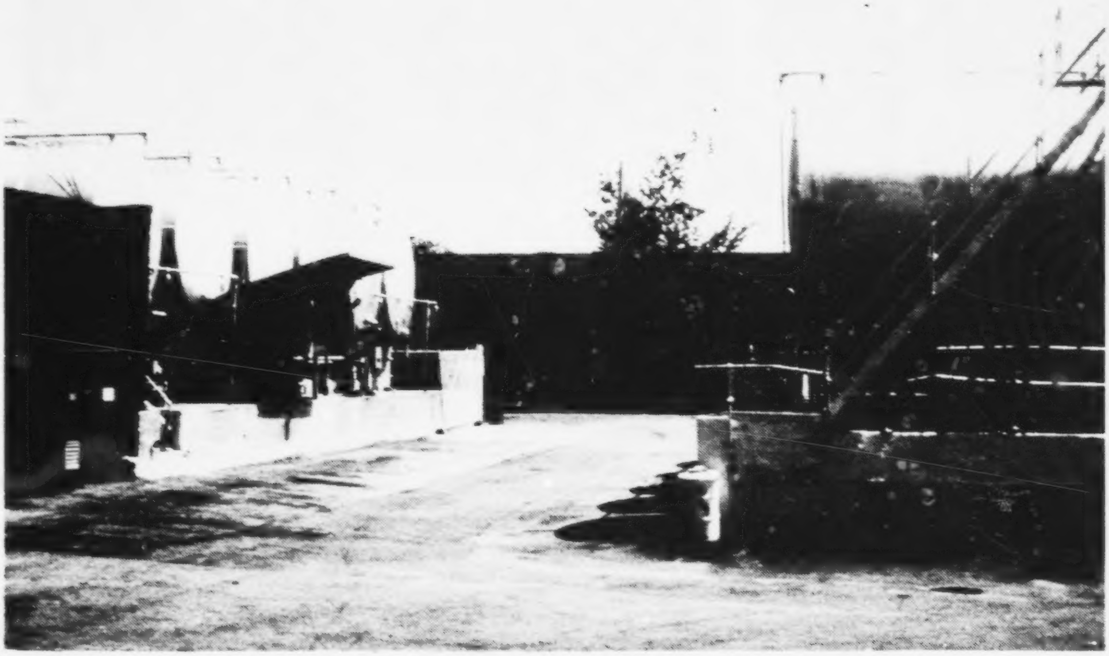


Figure 49. Small bulk plant in New Hampshire.

righthand group of tanks drains to a new 4,000-gallon hold sump, which is located between the tank and the existing catch basins. For the lefthand group of tanks, any spill would enter the sewer; in the event of a minor spill, a sand barrel and shovel are available for preventing this from happening. In the case of a major spill, a front-end loader is available to position the 15 tons of sand normally kept at the facility.

Small Fuel Oil Distributor (Vermont) — This facility is shown in Figure 50 and is probably the worst installation surveyed in the New England area. The diking is inadequate and the housekeeping is rather poor. The facility is long and narrow (250 feet by 50 feet) and is bounded on one side by a street and on the other by Stephens Branch, which empties into the Winooski River downstream about 5 miles. The total capacity of this facility is about 100,000 gallons, consisting of 5,000 gallons of 80-octane gasoline, 15,000 gallons of hi-test gasoline, 15,000 gallons of regular gasoline, 20,000 gallons of kerosene and the balance of about 45,000 gallons consisting of #2 fuel oil.

The existing dike begins at the garage and extends along the river bank and returns to the street. The area under the tanks is only 8 or 10 inches below street level, and any spill would gravitate to a low spot between the tanks and the street. The SPCC plan for this facility called for containment of 15,000 gallons in lieu of the 20,000-gallon capacity of the largest tank

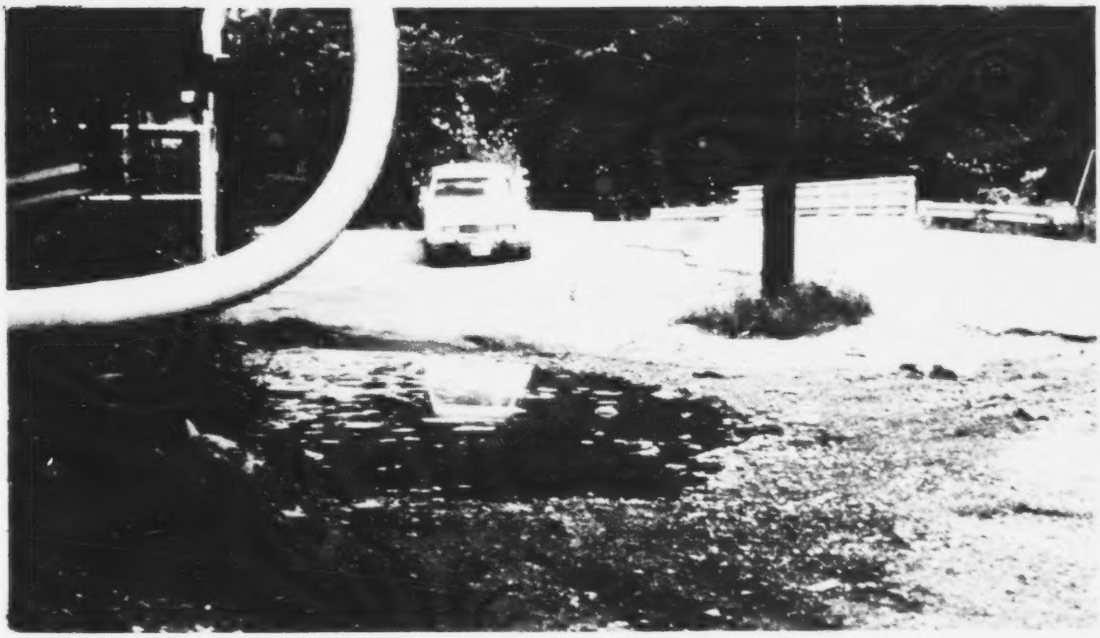


Figure 50. Small bulk plant No. 1 in Vermont.

(this is inconsistent with the guidelines section of the Oil Pollution Prevention regulations 40 CFR 112.7 (e) 2 ii) and a 1.7-foot-high dike with a zero bottom area and a 2,350-square-foot top area. The existing dike is 3 feet high, but it does not protect the street area. Any major spill would run by the dike and enter Stephens Branch. The lighting at this facility is adequate, but the three tanks in the foreground have been leased out and have no fencing. The cost of the preparation of the SPCC plan for this facility was $440. However, it appears that this money was wasted in view of the remaining spill potential of this facility.

Small Fuel Oil Distributor (Vermont) — The facility shown in Figures 51 and 52 is in fairly good condition with the one exception of security fencing. The general drainage pattern for this facility (see Figure 51) is directed toward the catch basin for a city storm sewer. During heavy rains, water accumulates in the vicinity of the horizontal storage tank battery and must be drained from this area. Even a minor spill during this time could create some potential problems.

A concrete block wall begins behind the office building (Figure 51) and encloses three sides of the horizontal tanks. The area under the tank battery averages 10 inches below the grade level outside of the tank area where the city storm sewer catch basin is located. A full tank rupture would probably flood toward the loading rack and street. In order to prevent this from

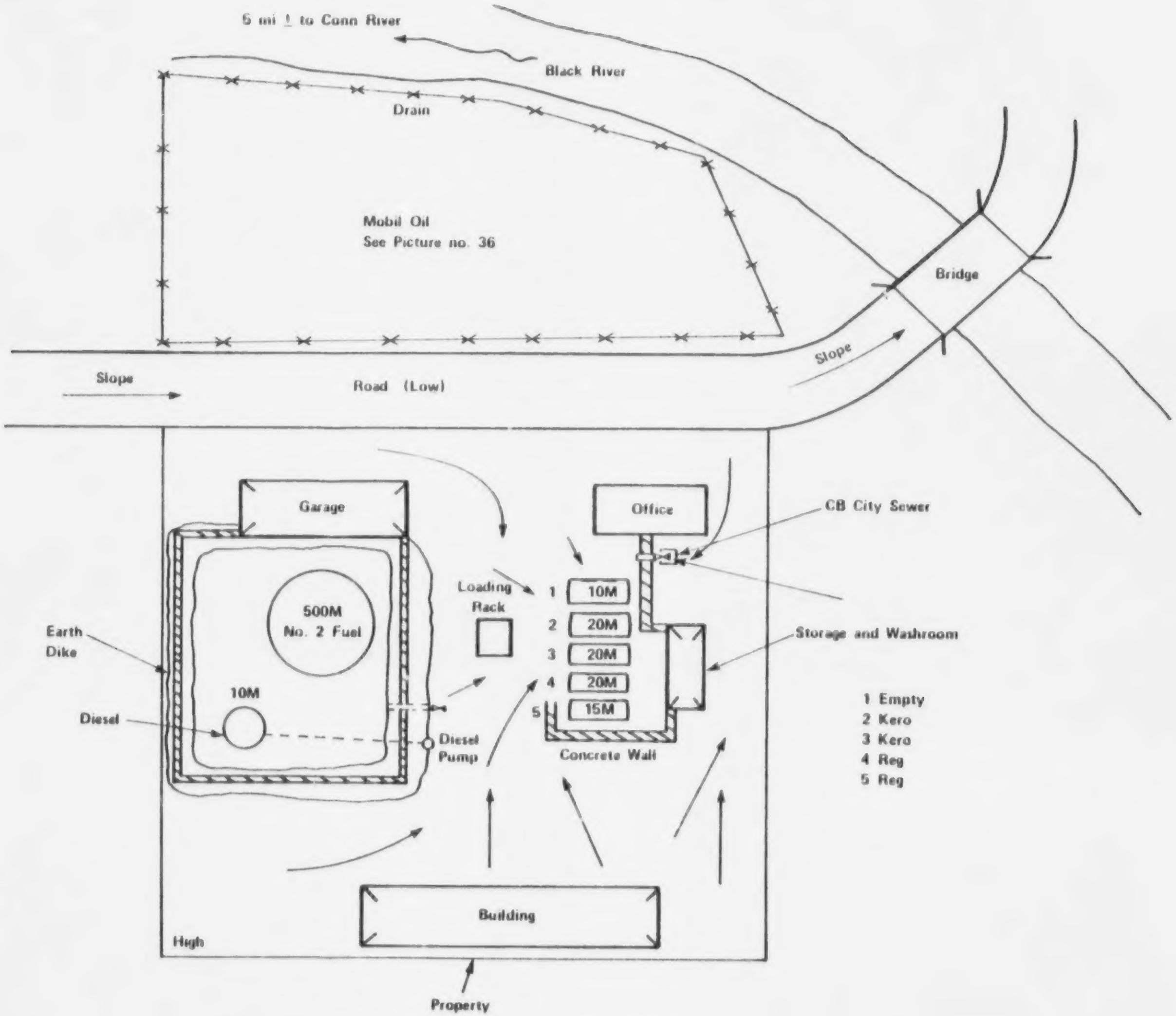

5 mi ± to Conn River
Black River
Drain
Mobil Oil
See Picture no. 36
Bridge
Slope
Road (Low)
Slope
Garage
Office
CB City Sewer
Loading
Rack
500M
No. 2 Fuel
Earth
Dike
10M
Diesel
Diesel
Pump
1
10M
2
20M
3
20M
4
20M
5
15M
Concrete Wall
Storage and Washroom
1 Empty
2 Kero
3 Kero
4 Reg
5 Reg
Building
High
Property

Figure 51. Layout of small bulk plant No. 2 in Vermont.

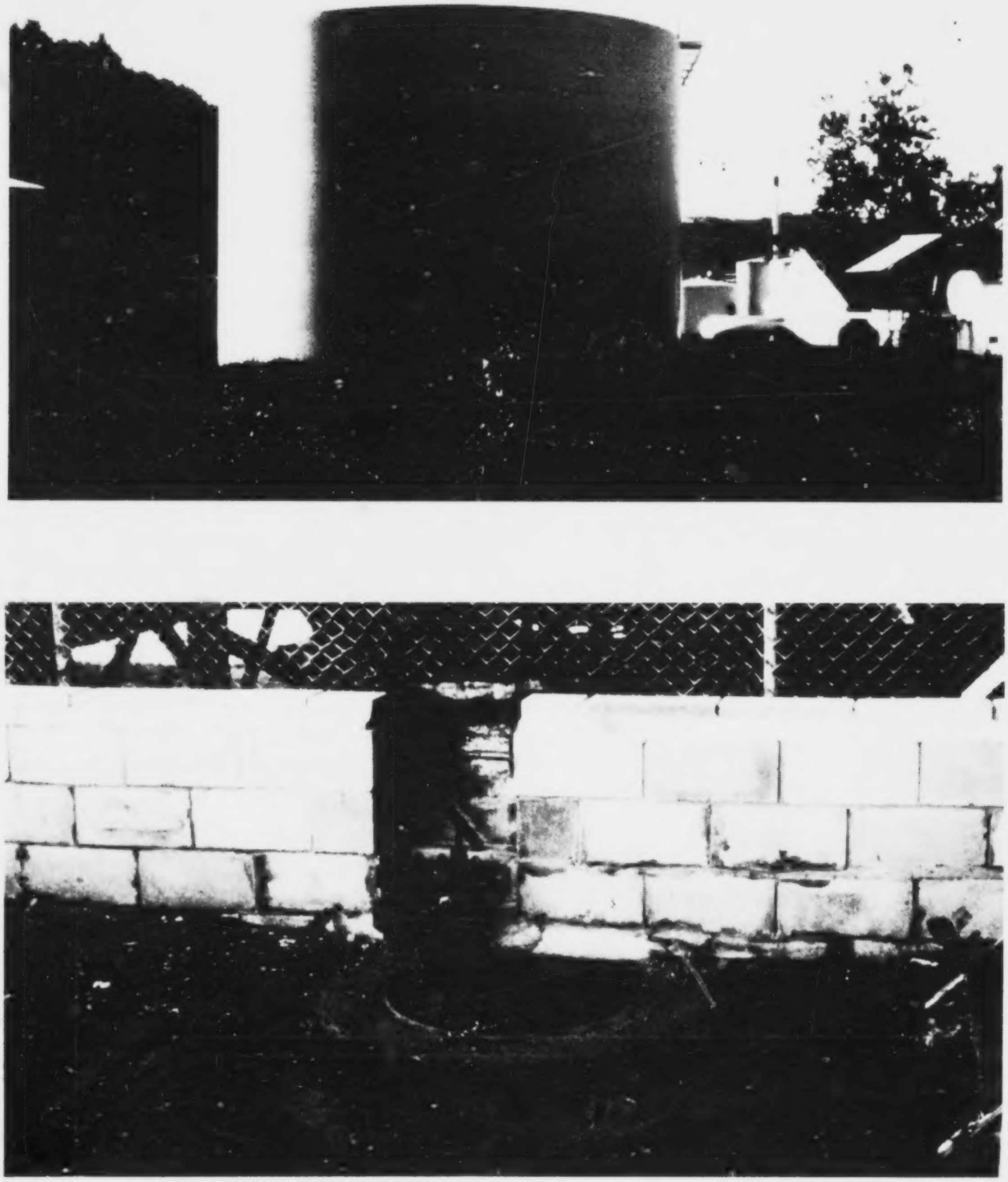
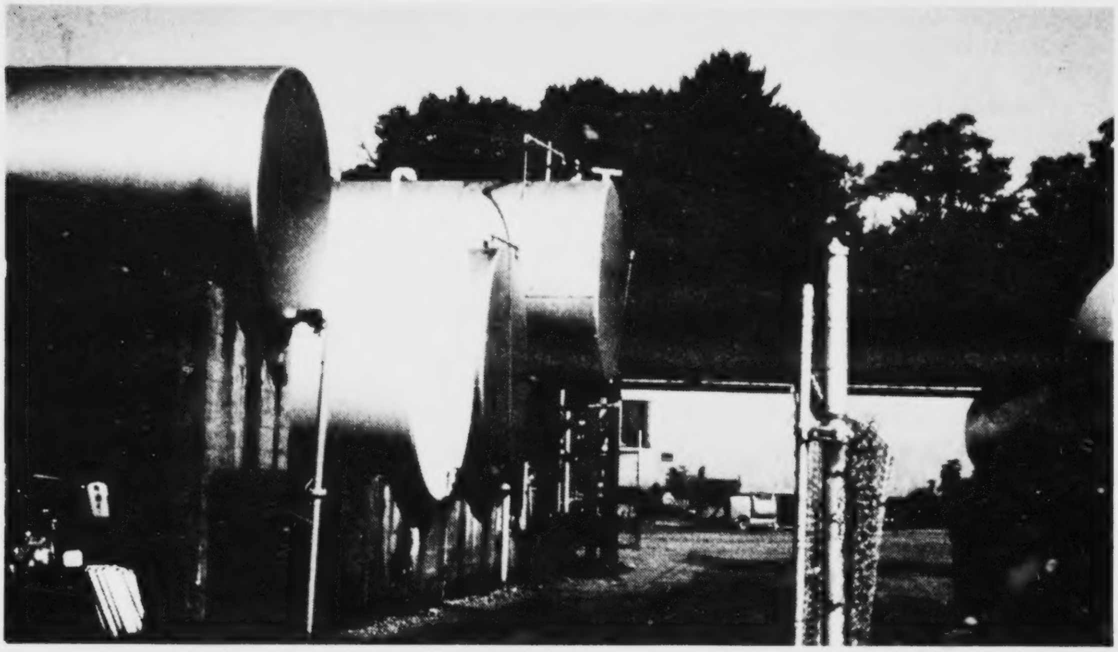


Figure 52 (a & b). Small bulk plant No. 2 in Vermont.



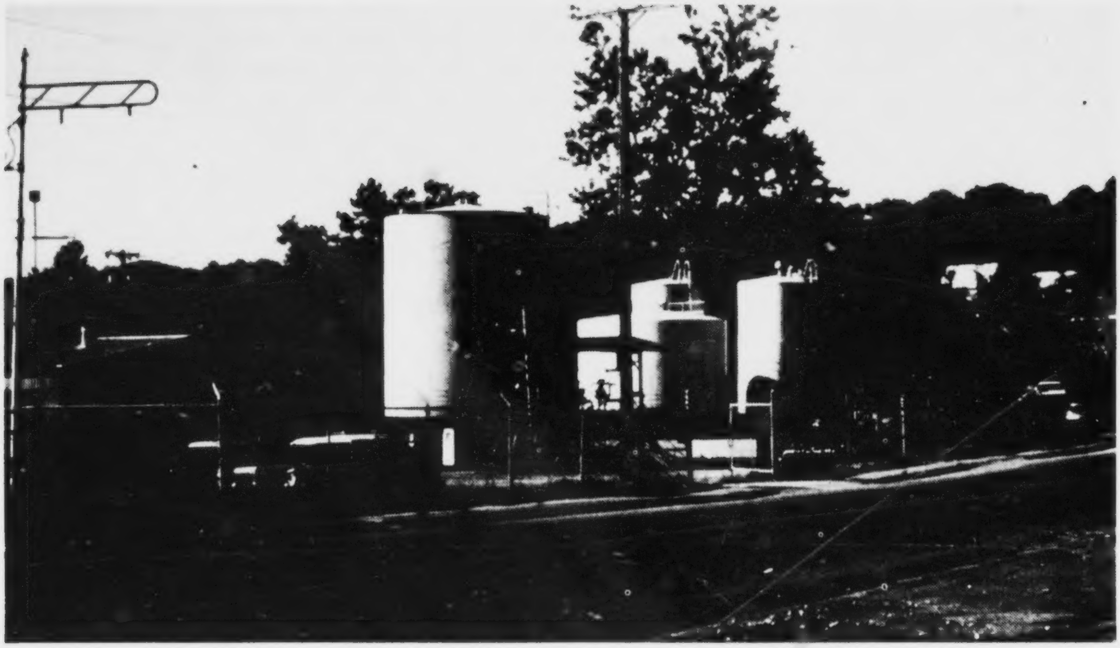


Figure 52 (c & d). Small bulk plant No. 2 in Vermont.

happening, the concrete block wall should be extended so as to enclose the entire tank battery.

Small Fuel Oil Distributor (Massachusetts) — This distributor has a main plant that has been in the family for three generations and has recently purchased four additional facilities within a range of 20 to 25 miles. The total capacity of all of these facilities is 255,000 gallons, with 70,000 gallons at the main plant and between 40,000 and 50,000 gallons at each of the remaining facilities. The SPCC plan for this operation does not have a writeup, instead it lists tank capacities, personnel, telephone numbers of EPA, fire departments, etc., material available for spill clean-up and a drawing of each installation showing contours, containment capacities and other improvements. To date (time of the survey) this facility owner had expended $45,000 for improvements, with another $10,000 anticipated for the near future to complete the work. A good deal of ingenuity has been displayed in adapting the natural terrain to his facilities' requirements.

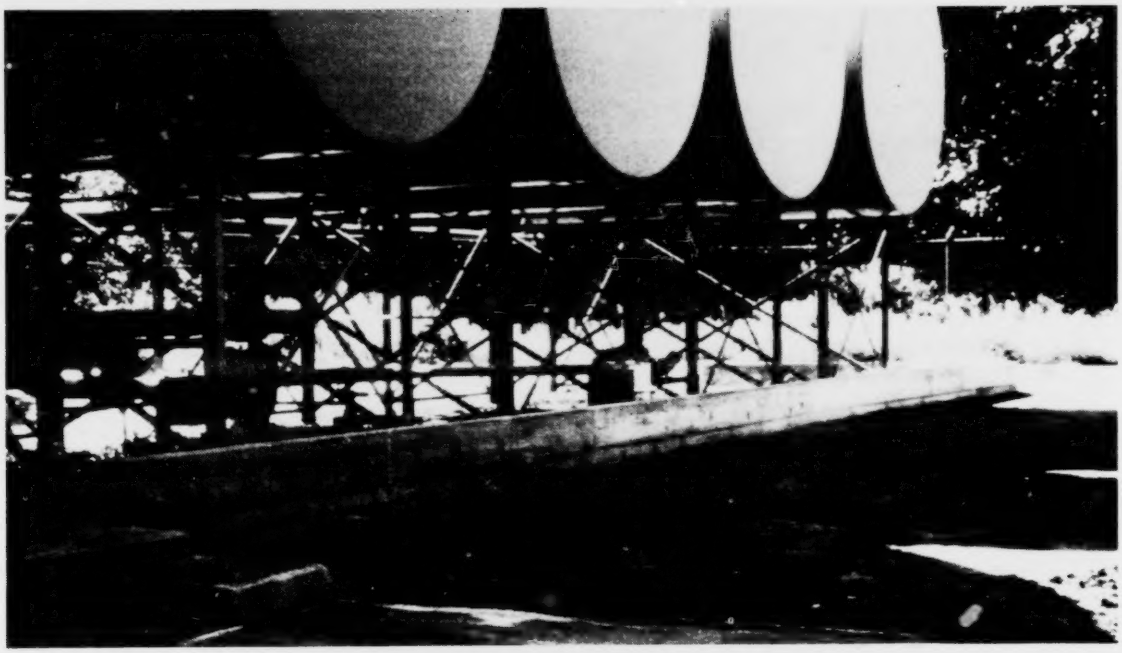
The main plant (shown in Figure 53) is completely fenced and the housekeeping and lighting are excellent. The seven 10,000-gallon storage tanks are on high ground in the rear of the facility. The containment volume was obtained by constructing a crosswalk between the building and telephone pole (top photo of Figure 53). The wall on the opposite side of the tank battery has been constructed in such a manner as to divert a spill into the containment area. The concrete loading pad with the catch basin also drains to the containment area.

Figure 54 shows a 50,000-gallon facility located between two highways, one lower than the facility and the other higher than the facility. A 50,000 gallon polyethylene-lined pit which catches all spills and rainwater at this facility is also shown in Figure 54. The valve from the pit leads to a dry well for the disposal of clean water.

Figure 55 shows a 40,000-gallon facility which has had only a small curb installed beyond the tanks and in front of the highway. This curb turns all of the spilled material into a natural grass-lined depression capable of containing the contents of the largest tank.

Technical Problems Encountered

Figure 56 shows a typical tank battery installation. The number of tanks in a battery generally varies between 3 and 5 and occasionally there are combinations of both horizontal and vertical storage tanks within a battery. The most common situation is to have 3 to 5 horizontal storage tanks, each having a capacity of between 10,000 and 20,000 gallons. The loading and unloading of these tanks usually occurs along the long dimension of the facility. This type of facility can usually hold within its dikes the contents of the largest tank plus the accumulated rainfall. Although a tank rupture which releases the contents of the tank in a very short period of time is rare, the force and velocity of the emerging fluid could easily surge over the top of the dike. Another event, not quite as rare as a tank rupture, is the occurrence of a hole in the tank. This latter situation can occur from tank corrosion or a bullet hole. For a typical 10-foot-high (completely filled) tank, this



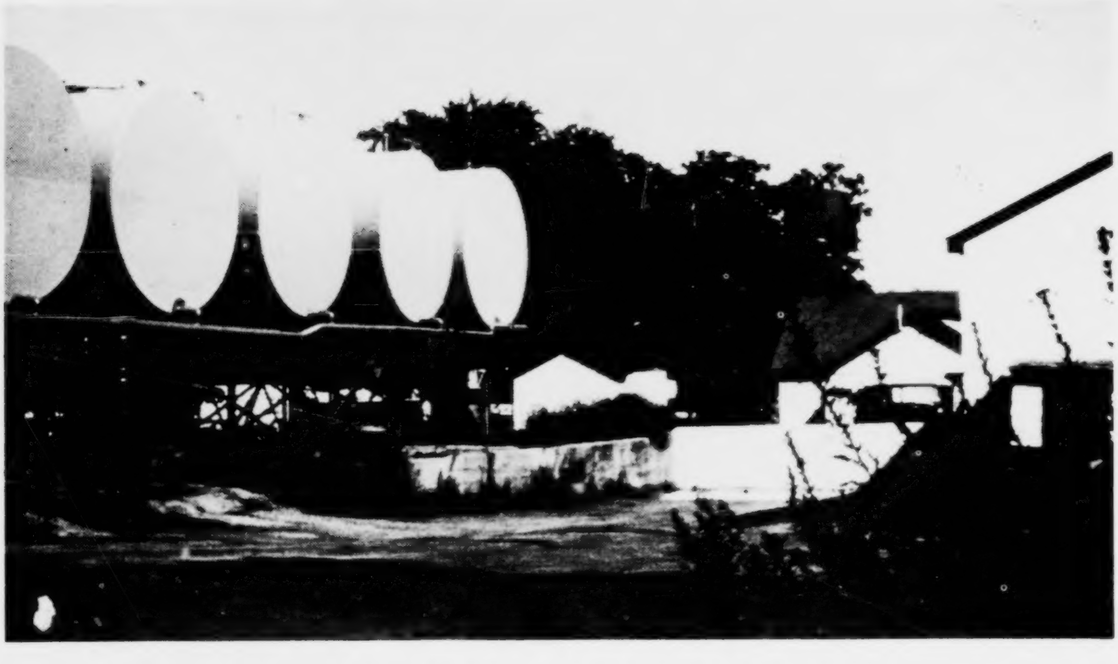


Figure 53 (a & b). Small bulk fuel distributor in Massachusetts, main plant.

Figure 54. Small fuel distributor in Massachusetts, Branch Plant No. 1.

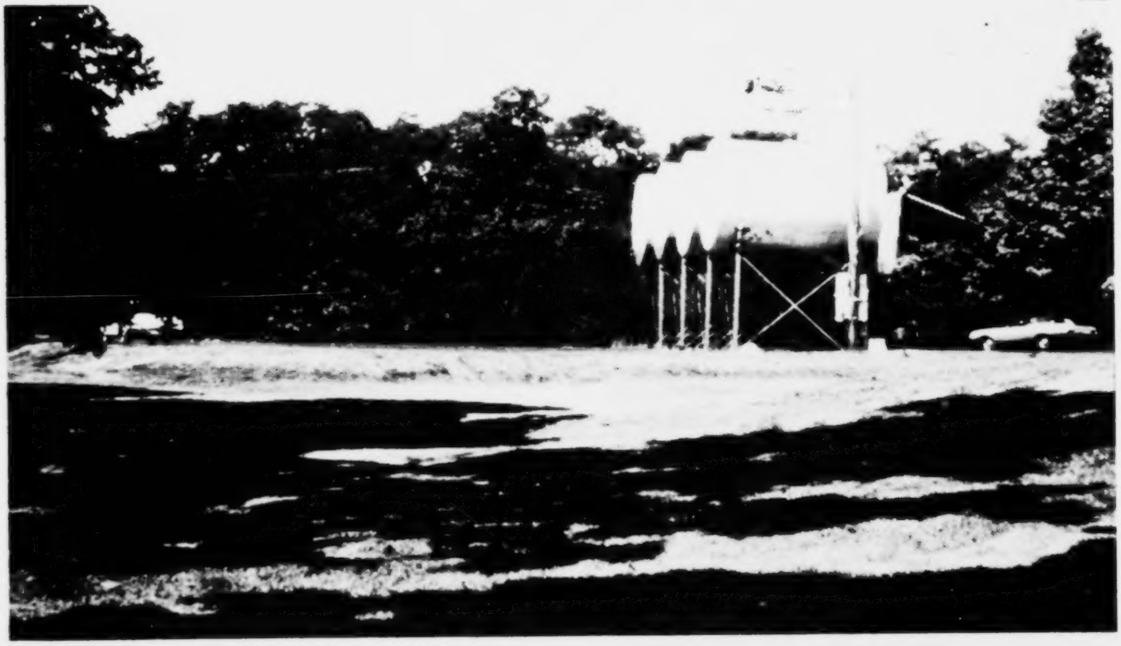
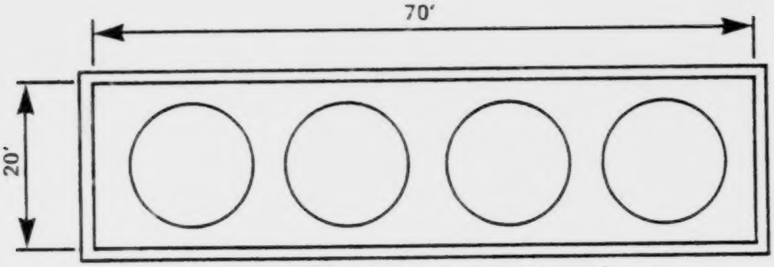
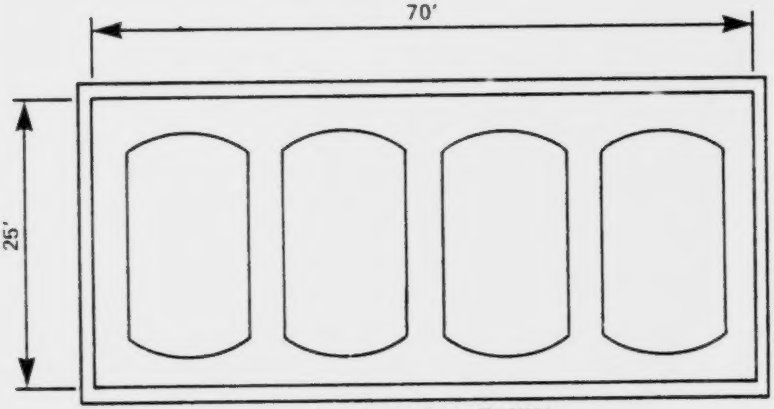


Figure 55. Small bulk fuel distributor in Massachusetts which uses natural topographical features (depression in ground) to catch a potential spill from storage tanks.



VERTICAL TANKS (12' Diameter)

Cont. Area $(70 \times 20 - 3\pi 6^2)$ 7.5 = 7950 gal /ft of height



HORIZONTAL TANKS

Cont. Area 70 x 25 x 7.5 = 13,100 gal /ft pf

Figure 56. Typical bulk station tank battery.

latter situation would cause a stream of fluid having a velocity of ~25 fps. If the tank were 16 feet above the ground (typical height), then the stream of fluid would pass over the dike. In order to overcome this problem, a secondary dike and/or possibly some grading of the area exterior to the tank battery would be required. The most favorable solution, however, would be to extend the dikes to a distance of 25 feet from any tank and to include the truck loading and unloading racks within that expanded area. This solution would eliminate the need for two separate drainage systems, one for the truck and the other for the tank battery. In addition, an overall lower dike height would be required.

In some cases drainage from these dikes is from the low point of the interior surface. Moreover, at other facilities, engineers have specified oil/water separators to be incorporated into the drainage systems. It is our recommendation that a sump 36 inches square and 36 inches deep be placed inside the dike. In this sump, a pipe should be positioned 6 inches from the bottom surface to ensure draining only clean uncontaminated water from the diked area.

Operating Procedures

The operating procedures followed by the bulk oil marketing facilities generally fall into two categories: those concerned with the larger facilities which are located on the coastline and those that are followed by the smaller inland dealers. For the larger facilities, these procedures are in written form and follow to the letter the EPA and USCG guidelines. In the case of the smaller facilities, the procedures are fairly simple and are not in writing. For the latter case, of most interest here, the fuel oil is generally delivered by transport trucks during the normal working hours. The rules that are generally followed at the facility are: No smoking, shut off truck motor, connect truck to ground system, check all valves (truck and facility) for proper flow, gage tanks and fill. When this procedure has been completed, reverse the procedure. The delivery trucks are manned by employees of the facility who are constantly being drilled on clean-up procedures. For this reason, these trucks always carry shovels and sorbent material for clean-up purposes.

Discussion of Existing SPCC Plans

All of the installations visited in New England had SPCC plans prepared. These plans were in report form and generally contained the following information:

1) Name of company, location, personnel and persons to notify in the event of a spill

2) Verbal description of the facility, a layout drawing of the facility and the types of oil stored

3) Direction of drainage

4) Material available for clean-up

5) Containment volume required and how to provide it.

The preparation of the facility drawing was the plan's most important feature, particularly in those cases where contours and elevations were noted. However, very little information was given for operating procedures, lighting, security, and housekeeping, except for the >200,000-gallon storage facilities. The impression left by these plans was that the preparers were not familiar with the specific requirements of 40 CFR Part 112.

Recommended SPCC Plans

Recommended SPCC plans for bulk plants of the type encountered in New England would be broken down as follows (typical SPCC plans for each of two generic facility types are shown in Appendix H):

1) Company Information — Name, location, list of officers and personnel in charge of spill prevention

2) List of agencies to notify in the event of a spill

3) Spill history

4) Facility Description — In addition to listing tanks and capacities, equipment, trucks, etc., and spill clean-up materials on hand, a drawing of the entire facility should be made to include property lines, streets, buildings, dikes, related equipment, contours of key elevations, and drainage patterns

5) Spill containment (including dike materials, volume and design)*

   a) Drainage (see 40 CFR Part 112.7 (e) 1)

   b) Tanks (see 40 CFR Part 112.7 (e) 2)

   c) Facility transfer pumps (see 40 CFR Part 112.7 (e) 3)

   d) Loading racks (see 40 CFR Part 112.7 (e) 4)

6) Inspection (see 40 CFR Part 112.7 (e) 8)

7) Security (fencing, lighting, valves) (see 40 CFR Part 112.7 (e) 9)

8) Personnel training (see 40 CFR Part 112.7 (e) 10)

9) Operating procedures.

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* Can be shown on a drawing under Item 4.

Impact of SPCC Plan Implementation

The technical problems associated with the bulk marketing facilities in complying with 40 CFR Part 112 generally are not difficult to solve. Many facility owners in the New England area have spent in the range of $10K to $50K for spill containment only. However, in many of these cases, the problem of security (fences, lights, etc.) has been overlooked. This latter item, if included in the facility modification, could result in substantial additional funds expended by the owner/operator.

Conclusions

1) The spill experience in this area is quite good, with the largest spills in the range of 500 gallons. Most of these spills have been caused by personnel error rather than equipment failure.

2) A Massachusetts dealers' association estimated that of its 450 members (which represent about 1/3 of the total dealers and about 75 percent of the volume of business in the state), that about 100 have not complied with the Oil Spill Prevention regulations and would prefer to close their businesses rather than comply.

3) The engineers in the New England area generally have not used the volume of the largest tank (rather, 75 to 85 percent of the largest tank) to calculate the required containment volume for the various facilities. This situation is counter to the requirements of the guidelines section of the Oil Spill Prevention regulation (40 CFR 112.7 (e) 2 ii).

4) Security and lighting generally have been overlooked at many of the facilities visited, primarily because the engineers preparing SPCC plans in this area are unfamiliar with the details of 40 CFR Part 112.

5) The costs associated with the preparation of SPCC plans in this area have been in the $400 to $5,000 range, whereas the cost of implementation has been in the $5,000 to $50,000 range.

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APPENDICES

APPENDIX A. COST ESTIMATING DATA FOR ENGINEERING SOLUTIONS TO OIL SPILL PREVENTION AND CONTROL

This appendix presents unit cost data employed in developing the estimated costs for construction and equipment installations recommended elsewhere in this report for oil spill prevention and control at the production and distribution facilities of interest. To provide a standard reference baseline, nearly all of the unit costs given below were taken from Means' Building Construction Cost Data, 1974.* There are two exceptions. One is the towboat-barge costs that are necessarily incurred in moving construction materials and equipment to water-based facilities in the Louisiana area, where cost data were obtained directly from service contractors. The second exception is the cost figures for sump tanks, which were obtained directly from vendors.

In all cases, the cost data given here (Tables A-1 through A-3) tend to be conservative, essentially because no allowance has been made for inflation since 1974 (i.e., the cost figures are in 1974 dollars). In addition, the cost figures do not include the normal general contractor's profit margin, since facility owners/operators frequently perform the work with their own personnel. Other factors that would need to be considered are (1) prevailing wage rates in various areas of the country and (2) the accessibility of a site and its distance from available labor and equipment. With respect to prevailing wage rates, it should be noted that the Means data include installation labor and are based on costs averaged for 30 major urban areas across the country. The effects of the accessibility and distance factors can vary widely. The owners, operators, and contractors experience, as indicated during the surveys, has been that the added costs for transportation of materials and equipment, along with workers' travel time can add as much as 50 percent to the costs for getting work done at water-based facilities in Louisiana and up to 25 percent in the more remote sections of the Penn-Grade Area.

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* Building Construction Cost Data, 1974, 32nd Annual Edition, Robert Snow Means Company, Inc., Duxbury, Massachusetts, 1974.

TABLE A-1. CONSTRUCTION AND EQUIPMENT COSTS (INSTALLED)

Item	Cost/Unit
Concrete, slabs 4" to 5" thick	$1.50/sf
Concrete, 8" walls up to 3'0" high	160/sy
Concrete catch basins, with frame and grate	450 ea.
Polyethylene liner, 6 mil.	.045/sf
8 mil.	.048/sf
Floating booms	12.00/lf
Fence (chain link), 6' high with 3 strands barbed wire, 2" posts, 9 gauge steel	10.00/lf
Fence, field, wood posts, with 4 strands barbed wire	4.00/lf
Clearing land (small trees) manual	.30/sy
Valve, 3" gate	120 ea.
Valve, 4" gate	200 ea.
Pipe, 3" steel	6.00/lf
Pipe, 4" steel	7.00/lf
Underground Drains:	
6" Concrete pipe	2.50/lf
Trench excavation, machine	2.00/cy
Trench excavation, manual	10.00/cy
Trench backfill, machine	.60/cy
Trench backfill, manual	3.00/cy
Earthwork:	
Excavation, machine	1.00/cy
Excavation, manual	10.00/cy
Dike fill, machine	2.25/cy
Dike fill, manual	6.00/cy
Grading, manual	1.00/cy
Fill material, hauled in	3.00/cy
Drainage ditch	16.00/100 lf
Excavated material, haul out	.80/cy

TABLE A-2. COSTS FOR EARTH DIKES

Top Width	Slope	Height	cy/lf	Cost/lf Manual	Cost/lf Machine
18"	1 on 1½	18"	.17	$1.02	$ .39
18"	"	24"	.26	$1.56	$ .59
18"	"	36"	.52	$3.10	$1.17
18"	"	48"	1.10	$6.60	$2.48

Costs for Louisiana Water-Based Facilities

Costs for mobilization of material and equipment and tow-boat barge delivery are estimated to be $1,200 per facility.

TABLE A-3. COSTS FOR SUMP TANKS

Diameter × Length (ft)	Capacity (bbl)	Weight (lb)	Cost ($/lb)	Total Cost (each)
4 x 10	22	1580	0.85	$1,343
4 x 12	26	1840	0.85	1,570
5 x 8	28	1720	0.85	1,462
5 x 10	35	2045	0.85	1,739
5 x 12	42	2365	0.85	2,010
6 x 10	50	2542	0.85	2,160
6 x 12	60	2930	0.85	2,490
6 x 14	70	3315	0.85	2,818

APPENDIX B. SAMPLE OF EXISTING SPCC PLANS FOR THE TEXAS/OKLAHOMA REGION

(Prior to completing Part I, refer to regulations and instructions page 5.)

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN

PART I
GENERAL INFORMATION

1. Name of facility ____________

2. Type of facility Onshore Production Facility

3. Location of facility San Patricio County, Texas

4. Name and address of owner or operator:

Name Management Company

Address ____________

Corpus Christi, Texas 78401

5. Designated person accountable for oil spill prevention at facility:

Name and title ____________

6. Facility experienced a reportable oil spill event during the twelve months prior to Jan. 10, 1974 (effective date of 40 CFR, Part 112). (If YES, complete Attachment #1.) ____________

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

Signature ____________

Name ____________

Title Production Superintendent

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

____
Printed Name of Registered Professional Engineer

(Seal)

____
Signature of Registered Professional Engineer

Date 7/7/74

Registration No. ____________ State ____________

(Part 1) Page 1 of 3

PART I
GENERAL INFORMATION

7. Potential Spills — Prediction & Control:

Source	Major Type of Failure	Total Quantity (bbls)	Rate (bbls/hr)	Direction of Flow*	Secondary Containment

Discussion:

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*Attach map if appropriate.

Name of facility ____________________

Operator ____________________

(Part I) Page 2 of 3

PART I
GENERAL INFORMATION

[Response to statements should be: YES, NO, or NA (Not Applicable).]

8. **Containment or diversionary structures or equipment to prevent oil from reaching navigable waters are practicable. (If NO, complete Attachment #2.)** Yes

9. **Inspections and Records**
   - A. The required inspections follow written procedures. Yes
   - B. The written procedures and a record of inspections, signed by the appropriate supervisor or inspector, are attached.

   Discussion: Inspection procedure calls for a check of the water's odor, clarity and taste, prior to draining the dikes. The presence of any concealed pollutant that might occur at this facility can be easily ascertained in this manner. Should this check indicate a pollutant present, then a chemical analysis will be performed before the water is drained. The Drain Valve will be kept sealed in the closed position except when draining operations are being conducted. Draining operations will be conducted by a responsible person.

10. **Personnel, Training, and Spill Prevention Procedures**
    - A. Personnel are properly instructed in the following:
      - (1) operation and maintenance of equipment to prevent oil discharges, and Yes
      - (2) applicable pollution control laws, rules, and regulations. Yes

    Describe procedures employed for instruction: Personnel are given verbal instruction in operation and maintenance of equipment and applicable operating problems are discussed. Only experienced personnel are utilized in the operation of this facility.

    - B. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. Yes

    Describe briefing program: The plan is discussed verbally with all personnel involved in the operation of this facility. In addition to the plan, all known spill events, failures, malfunctioning components, and recent developed precautionary measures are discussed.

Name of facility ____________________

Operator ____________________

(Prior to completing Part II, Alternate B, refer to regulations and instructions page 7.)

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

A. Facility Drainage

1. Drainage from diked storage areas is controlled as follows (include operating description of valves, pumps, ejectors, etc.): Drainage from all diked storage areas is accomplished by means of a manually operated valve. The drain valve will be sealed in a closed position except when actual draining operations are being conducted.

2. The procedure for supervising the drainage of rain water from secondary containment into a storm drain or an open watercourse is as follows (include description of (a) inspection for pollutants, and (b) method of valving security). (A record of inspection and drainage events is to be maintained on a form similar to Attachment #3): (A) Prior to opening drain valve, water is checked for odor, taste and clarity. Should the presence of pollutants be suspected, then a chemical analysis is obtained. (B) Drain valve is manually operated and remains sealed except while rain water is actually being drained. A record is maintained of all draining events

3. Field drainage ditches, road ditches, and oil traps, sumps, or skimmers, if such exist, are inspected at regularly scheduled intervals for accumulations of oil. Yes
Describe inspection procedures, intervals, and methods employed to remove oil: All such places on this facility where oil might accumulate are visually inspected on a daily basis. All accumulations of oil are removed immediately. Means of removal may be a hand-held bucket or portable pump, or a vacuum truck as dictated by the size and location of the accumulation.

B. Bulk Storage Tanks

1. Describe tank design, materials of construction, and fail-safe engineering features: The tanks on this lease are standard API tanks and are in serviceable condition. Adequate capacity is provided.

Name of facility ____________________

Operator ____________________

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

2. Describe secondary containment design, construction materials, and volume: The tanks on these leases are surrounded by earthen retaining dikes. The dikes are constructed of clay earth which is impervious to oil. The dikes will retain the capacity of the tank battery plus the water from a 6-inch rain.

3. Describe tank examination methods and procedures: The tanks are checked and inspected daily by the lease pumper for leaks and for obvious corrosion. They are also given a most thorough inspection at regular intervals by supervisory personnel.

C. Facility Transfer Operations

1. Describe scheduled basis for examinations of above-ground valves and pipelines and salt water disposal facilities: All above-ground valves and pipelines are visually checked on a daily basis for leaks. This equipment is also checked by supervisory personnel at regular intervals and repairs or replacements are made immediately.

2. Describe flowline maintenance program to prevent spills: Flowlines are checked daily by visual inspection for leaks. If a leak is discovered, the operations are shut-in immediately and repairs and replacements are made prior to resuming operations.

D. Oil Drilling and Workover Facilities

1. A blowout preventer (BOP) assembly and well control system is installed before drilling below any casing string and, as required during workover operations. Yes
2. The BOP assembly is capable of controlling any expected wellhead pressure. Yes
3. Casing and BOP installations conform to state regulations. Yes

Name of facility ______

Operator ______

Reproduced from best available copy.

SPCC PLAN, ATTACHMENT #3
ONSHORE FACILITY BULK STORAGE TANKS
DRAINAGE SYSTEM

Inspection Procedure:

Record of drainage, bypassing, inspection, and oil removal from secondary containment:

Date of Drainage	Date of Bypassing		Date of Inspection	Oil Removal	Supervisor's or Inspector's Signature
	Open	Closed			

Name of facility ____________________

Operator ____________________

APPENDIX C. SAMPLE OF EXISTING SPCC PLANS FOR THE LOUISIANA REGION

(Prior to completing Part I, refer to regulations and instructions page 5.)

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN

PART I
GENERAL INFORMATION

1. Name of facility Facility No. 1
2. Type of facility Onshore Production Facility
3. Location of facility

   State of Louisiana

4. Name and address of owner or operator:

   Name

   Address

   Lafayette, Louisiana 70501

5. Designated person accountable for oil spill prevention at facility:

   Name and title Production Foreman - Onshore

6. Facility experienced a reportable oil spill event during the twelve months prior to Jan. 10, 1974 (effective date of 40 CFR, Part 112). (If YES, complete Attachment #1.) No

---

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

Signature

Name

Title Division Manager

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Printed Name of Registered Professional Engineer

(Seal)

Signature of Registered Professional Engineer

Date June 28, 1974

Registration No. State

(Part I) Page 1 of 3

PART I
GENERAL INFORMATION

7. Potential Spills — Prediction & Control:

Source	Major Type of Failure	Total Quantity (bbls)	Rate (bbls/hr)	Direction of Flow*	Secondary Containment
Flow Line to Heater and Heater	Leak or Rupture	200 B/D	8.33	South	Ring Levee (5,000 bbl.)
Flow Line-Heater to LTX & LTX Unit	Leak or Rupture	200 B/D	8.33	South	Ring Levee (5,000 bbl.)
Flow Line to Tank Battery	Leak	200 B/D	8.33	South	None
Gas Sales Line	Leak or Rupture	1 B/D	0.04	South	None
Low Pressure Separator at Tank Battery	Leak	200 B/D	8.33	North or South	Ring Levee (10,000 bbl.)
Tanks	Leak/ Rupture or	400 bbls.		North or South	Firewall & Ring Levee (10,000 bbl.)
	Overflow	200 B/D	8.33	North or South	Firewall & Ring Levee (10,000 bbl.)

Discussion:

The Meaux #1 Xmas tree and separation equipment are encircled by a ring levee maintained at ground elevation + 2 feet. All the water caught within this levee will be subject to inspection and any oil found will be removed before the water is drained into the drainage ditch.

---

*Attach map if appropriate.

Name of facility ____________________

Operator ____________________

PART I
GENERAL INFORMATION

7. Potential Spills — Prediction & Control:

Source	Major Type of Failure	Total Quantity (bbls)	Rate (bbls/hr)	Direction of Flow*	Secondary Containment
MEAUX NO. 2 WELL & TANK BATTERY					
Flow Line to Heater and Heater	Leak or Rupture	18 B/D	0.75	North or South	Ring Levee (10,000 bbl.)
Flow Line-Heater to LTX & LTX Unit	Leak or Rupture	18 B/D	0.75	North or South	Ring Levee (10,000 bbl.)
Flow Line-LTX to Heater-Treater and Heater-Treater	Leak or Rupture	18 B/D	0.75	North or South	Ring Levee (10,000 bbl.)
Flow Line-Heater-Treater to Tank	Leak or Rupture	18 B/D	0.75	North or South	Ring Levee (10,000 bbl.)
Tank	Leak or Rupture	210 bbls.		North or South	Firewall & Levee (10,000 bbl.)
	or Overflow	18 B/D	0.75	North or South	
Gas Sales Line	Leak or Rupture	1 B/D	0.04	North or South	None

Discussion:

The Meaux No. 2 Xmas tree, separation equipment, and the common tank battery are encircled by a ring levee maintained at ground elevation + 2 feet. The common tank battery is encircled by a firewall within the ring levee. All the water caught within the firewall and/or the ring levee will be subject to inspection, and any oil found will be removed before the water is drained into the drainage ditch.

---

*Attach map if appropriate.

Name of facility ____________________

Operator ____________________

PART I
GENERAL INFORMATION

[Response to statements should [illegible] YES, NO, or NA (Not Applicable).]

8. Containment or diversionary structures or equipment to prevent oil from reaching navigable waters are practicable. (If NO, complete Attachment #2.) Yes

9. **Inspections and Records**
   A. The required inspections follow written procedures. Yes
   B. The written procedures and a record of inspections, signed by the appropriate supervisor or inspector, are attached. Yes
   Discussion:

10. **Personnel, Training, and Spill Prevention Procedures**
   A. Personnel are properly instructed in the following:
   (1) operation and maintenance of equipment to prevent oil discharges, and Yes
   (2) applicable pollution control laws, rules, and regulations. Yes
   Describe procedures employed for instruction: Field personnel are contacted at least weekly to discuss the operation, maintenance and up-keep of production equipment as well as safety and environmental protection.

   B. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. Yes
   Describe briefing program: The field personnel played a major role in building the ring levees, installing the drains and valves therefore, they have a good understanding of the SPCC Plan.

   Monthly meetings are held to review the SPCC Plan.

Name of facility

Operator

(Prior to completing Part II, Alternate B, refer to regulations and instructions page 7.)

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

A. Facility Drainage

1. **Drainage from diked storage areas is controlled as follows (include operating description of valves, pumps, ejectors, etc.):** Drains have sealed valves. Rain water is inspected for rainbow before draining. Seal is removed, water drained and valve resealed.

2. **The procedure for supervising the drainage of rain water from secondary containment into a storm drain or an open watercourse is as follows (include description of (a) inspection for pollutants, and (b) method of valving security). (A record of inspection and drainage events is to be maintained on a form similar to Attachment #3):** Pumper will inspect rain water for condensate or rainbow. Any pollutants present shall be removed before draining. After satisfactory inspection, the valve will be unsealed, water drained and valve resealed. Drainage will be recorded on proper drainage system record.

3. **Field drainage ditches, road ditches, and oil traps, sumps, or skimmers, if such exist, are inspected at regularly scheduled intervals for accumulations of oil.** Yes
Describe inspection procedures, intervals, and methods employed to remove oil: On skimmers located within secondary containment, pumper will visually inspect daily. Any condensate accumulation shall be returned to tank or removed by approved oil absorbent material.

B. Bulk Storage Tanks

1. **Describe tank design, materials of construction, and fail-safe engineering features:** All storage tanks located within one common 1000 barrel firewall. The 1000 barrel firewall and tanks are located within a 10,000 bbl. secondary containment.

Meaux #1	2-210 bbl. welded API tanks
	1-400 bbl. welded API tank
Meaux #2	2-210 bbl. welded API tanks
Salt Water Disposal	1-400 bbl. welded API tank

All tanks have 2-ounce pressure/vacuum thief hatch, vent lines, and equalizing lines.

Name of facility ______________________

Operator ______________________

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

2. Describe secondary containment design, construction materials, and volume: Secondary containment consists of earthen firewalls, dikes and ring levees with a minimum capacity equal to the largest tank plus a sufficient allowance for precipitation.

3. Describe tank examination methods and procedures: Tanks, foundations and firewalls shall be visually inspected daily by pumper. Monthly inspection by supervisor at time of monthly safety and environmental protection meeting.

C. Facility Transfer Operations

1. Describe scheduled basis for examinations of above-ground valves and pipelines and salt water disposal facilities: Valves, pipelines and SWD facilities are visually inspected daily by pumper and monthly by supervisor.

2. Describe flowline maintenance program to prevent spills: Flow lines are visually inspected daily by pumper and monthly by supervisor.

D. Oil Drilling and Workover Facilities

1. A blowout preventer (BOP) assembly and well control system is installed before drilling below any casing string and, as required during workover operations. Yes
2. The BOP assembly is capable of controlling any expected wellhead pressure. Yes
3. Casing and BOP installations conform to state regulations. Yes

Name of facility

Operator

SPCC PLAN, ATTACHMENT #3
ONSHORE FACILITY BULK STORAGE TANKS
DRAINAGE SYSTEM

Inspection Procedure: Pumper will inspect rainwater for condensate or rainbow. Any pollutants present shall be removed before draining. After satisfactory inspection, the valve will be unsealed, water drained, and valve resealed.

Record of drainage, bypassing, inspection, and oil removal from secondary containment: P. MEAUX #1

Date of Drainage	Date of Bypassing		Date of Inspection	Oil Removal	Supervisor's or Inspector's Signature
	Open	Closed			

Name of facility ______________________________

Operator ______________________________

(Attachment #3, SPCC Plan)

SPCC PLAN, ATTACHMENT #3
ONSHORE FACILITY BULK STORAGE TANKS
DRAINAGE SYSTEM

Inspection Procedure: Pumper will inspect rainwater for condensate or rainbow. Any pollutants present shall be removed before draining. After satisfactory inspection, the valve will be unsealed, water drained, and valve resealed.

Record of drainage, bypassing, inspection, and oil removal from secondary containment: P. MEAUX #2

Date of Drainage	Date of Bypassing		Date of Inspection	Oil Removal	Supervisor's or Inspector's Signature
	Open	Closed			

Name of facility ____________________

Operator ____________________

(Attachment #3, SPCC Plan)

SPCC PLAN, ATTACHMENT #3
ONSHORE FACILITY BULK STORAGE TANKS
DRAINAGE SYSTEM

Inspection Procedure: Pumper will inspect rainwater for condensate or rainbow. Any pollutants present shall be removed before draining. After satisfactory inspection, the valve will be unsealed, water drained, and valve resealed.

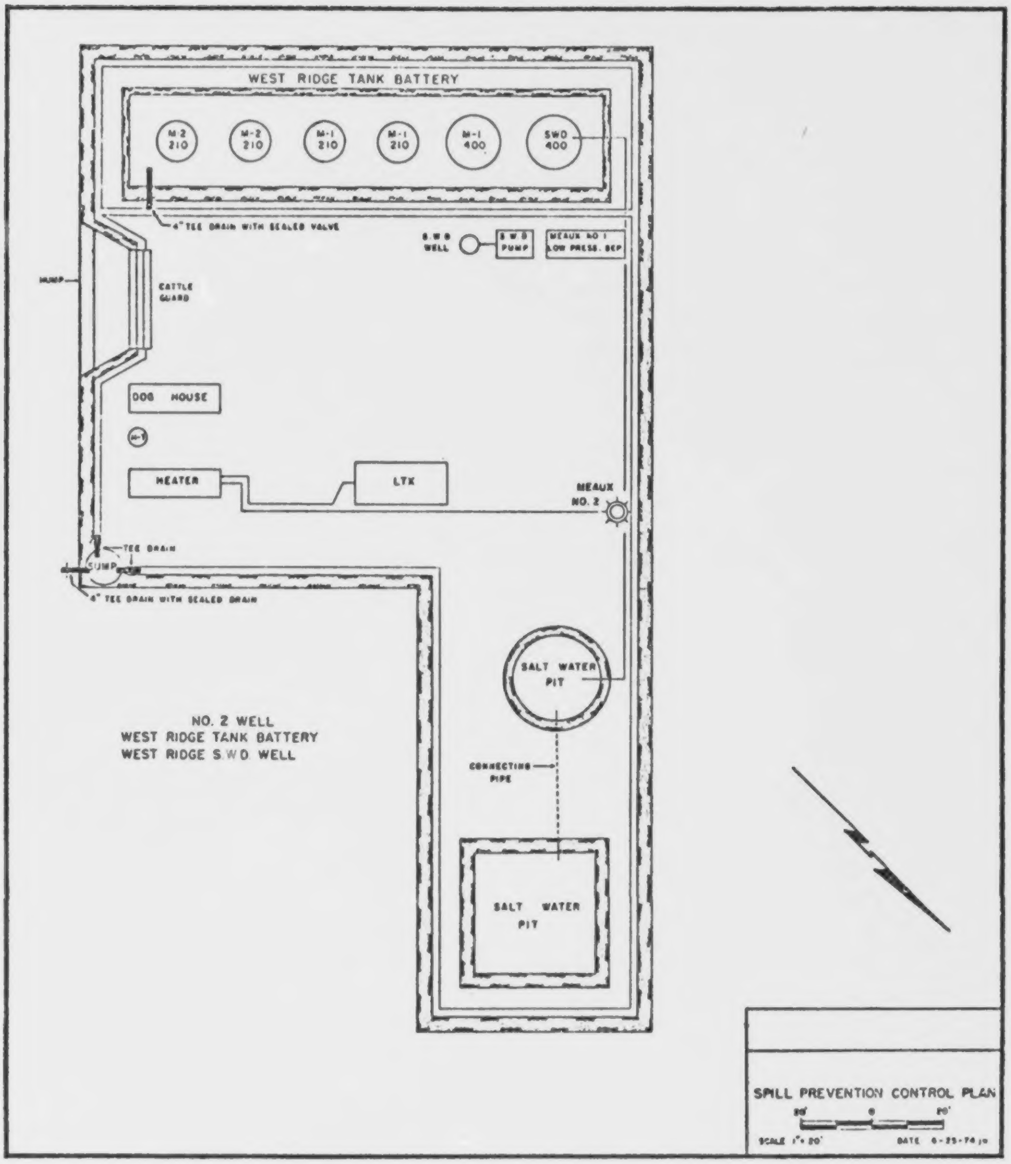
Record of drainage, bypassing, inspection, and oil removal from secondary containment: WEST RIDGE TANK BATTERY

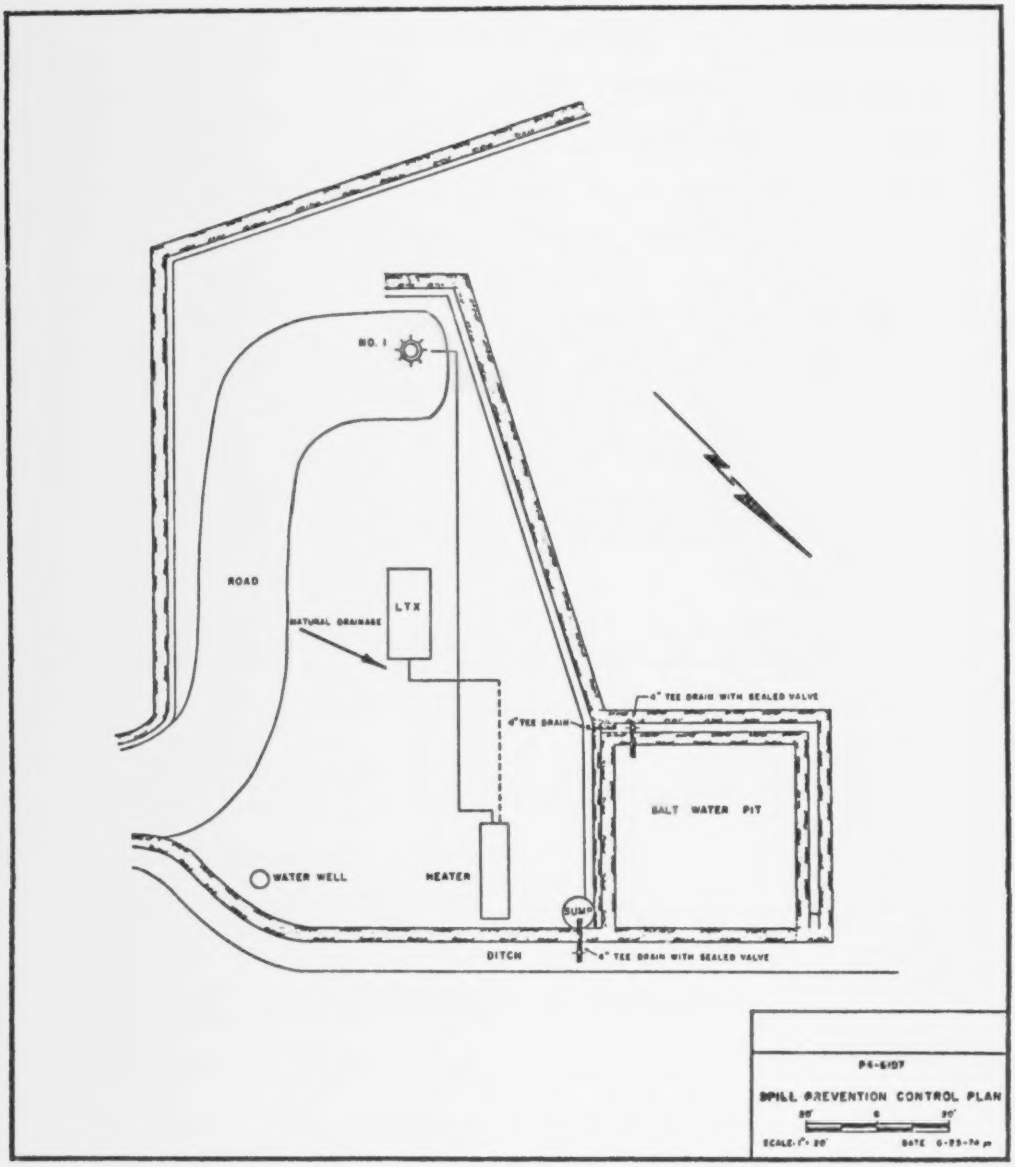
Date of Drainage	Date of Bypassing		Date of Inspection	Oil Removal	Supervisor's or Inspector's Signature
	Open	Closed			

Name of facility ____________________

Operator ____________________

(Attachment #3, SPCC Plan)


WEST RIDGE TANK BATTERY
M-2 210
M-2 210
M-1 210
M-1 210
M-1 400
SWD 400
4" TEE DRAIN WITH SEALED VALVE
S.W.D. WELL
S.W.D. PUMP
MEAUX NO 1 LOW PRESS. SEP
HUMP
CATTLE GUARD
DOG HOUSE
M-1
HEATER
LTX
MEAUX NO. 2
TEE DRAIN
SUMP
4" TEE DRAIN WITH SEALED DRAIN
SALT WATER PIT
CONNECTING PIPE
SALT WATER PIT
NO. 2 WELL
WEST RIDGE TANK BATTERY
WEST RIDGE S.W.D. WELL
N
SPILL PREVENTION CONTROL PLAN
20' 0 20'
SCALE 1" = 20'
DATE 6-25-74 jo


NO. 1
ROAD
LTX
NATURAL DRAINAGE
4" TEE DRAIN WITH SEALED VALVE
4" TEE DRAIN
SALT WATER PIT
WATER WELL
HEATER
SUMP
DITCH
4" TEE DRAIN WITH SEALED VALVE
P4-6107
SPILL PREVENTION CONTROL PLAN
20' 0 20'
SCALE: 1" = 20'
DATE 6-25-74 jm

(Prior to completing Part I, refer to regulations and instructions page 5.)

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN

PART I
GENERAL INFORMATION

1. Name of facility Facility #2

2. Type of facility Intermediate Production Facility

3. Location of facility ____________________

4. Name and address of owner or operator:

Name ____________________

Address ____________________

5. Designated person accountable for oil spill prevention at facility:

Name and title Production Superintendent

6. Facility experienced a reportable oil spill event during the twelve months prior to Jan. 10, 1974 (effective date of 40 CFR, Part 112). (If YES, complete Attachment #1.) ____________

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

Signature ____________________

Name ____________________

Title ____________________

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Printed Name of Registered Professional Engineer

(Seal)

Signature of Registered Professional Engineer

Date July 1, 1974

Registration No. ____________ State ____________

(Part I) Page 1 of 3

PART I
GENERAL INFORMATION

7. Potential Spills — Prediction & Control:

Source	Major Type of Failure	Total Quantity (bbls)	Rate (bbls/hr)	Direction of Flow*	Secondary Containment
16" Main Line Onshore	Major Line Break	30	30 bbls/hr	South	Not Practical

Discussion: The above prediction is based on a complete break in the 16" Main Line feeding this facility. All offshore wells are equipped with safety shut-in devices which should readily react to the pressure drop and shut in all flow within 10 minutes. Only fluid lost from the line should be that which gravitates out of the line. Since the 16" line at the offshore structure is some 45' above the beach line, it is calculated that a maximum of 11 barrels of fluid 50 percent oil would gravitate out of line with an estimated 50 barrels of fluid (50 percent oil) to be blown out while line pressure is bleeding off.

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*Attach map if appropriate.

Name of facility ______________________________

Operator ______________________________

(Part I) Page 2 of 3

PART I
GENERAL INFORMATION

[Response to statements should be: YES, NO, or NA (Not Applicable).]

8. Containment or diversionary structures or equipment to prevent oil from reaching navigable waters are practicable. (If NO, complete Attachment #2.) Yes

9. Inspections and Records
   A. The required inspections follow written procedures. Yes
   B. The written procedures and a record of inspections, signed by the appropriate supervisor or inspector, are ~~attached~~. filed in office. Yes
   Discussion:

10. Personnel, Training, and Spill Prevention Procedures
   A. Personnel are properly instructed in the following:
      (1) operation and maintenance of equipment to prevent oil discharges, and Yes
      (2) applicable pollution control laws, rules, and regulations. Yes
   Describe procedures employed for instruction: All employees have been instructed in spill prevention and are periodically refreshed as to procedures and furnished copies of laws and regulations.

   B. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. Yes
   Describe briefing program: New employees are briefed as to the importance of spill prevention and periodic briefings will be scheduled.

Name of facility

Operator

(Prior to completing Part II, Alternate B, refer to regulations and instructions page 7.)

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[*Response to statements should be: YES, NO, or NA (Not Applicable).*]

A. Facility Drainage

1. Drainage from diked storage areas is controlled as follows (include operating description of valves, pumps, ejectors, etc.): Salt water in tank firewall can be drained into water pit adjacent to diked area. Oil and water within diked area and adjacent water pit are picked up by a portable pump powered by an internal combustion engine and recycled through gun-barrel and tanks.

2. The procedure for supervising the drainage of rain water from secondary containment into a storm drain or an open watercourse is as follows (include description of (a) inspection for pollutants, and (b) method of valving security). (A record of inspection and drainage events is to be maintained on a form similar to Attachment #3): Not drained.

3. Field drainage ditches, road ditches, and oil traps, sumps, or skimmers, if such exist, are inspected at regularly scheduled intervals for accumulations of oil. Yes
Describe inspection procedures, intervals, and methods employed to remove oil: The ditches are under daily surveillance. Should any accumulation appear it will be picked up by a vacuum truck and returned to the gun-barrel.

B. Bulk Storage Tanks

1. Describe tank design, materials of construction, and fail-safe engineering features:
3 - 1,000 bbl. bolted galvanized steel tanks - Condensate
1 - 1,500 bbl. bolted galvanized gun-barrel
1 - 1,000 bbl. bolted galvanized steel tank - water settling.

All storage tanks have overflow lines to other tanks and are protected by pressure/vacuum thief hatches and by vapor-recovery valves.

Name of facility ____________________

Operator ____________________

PART II. ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

2. Describe secondary containment design, construction materials, and volume: The tank battery is protected by a firewall of impervious material which calculates to hold 3,930 bbls of fluid which is over twice the volume of fluid held by the largest tank. This also covers a sufficient allowance for precipitation.

3. Describe tank examination methods and procedures: Tanks are examined frequently by the production foreman for any external indications of possible failure. Internal examinations are made by foreman during any tank cleaning occurrences. Expert personnel are consulted any time tank conditions are questionable.

C. **Facility Transfer Operations**

1. Describe scheduled basis for examinations of above-ground valves and pipelines and salt water disposal facilities: Transfer valves and lines in the battery area are visible at all times and are inspected daily. The salt water disposal facility is checked daily and settling tank effluent is sampled monthly.

2. Describe flowline maintenance program to prevent spills: The 16" lines servicing this facility are protected against corrosion by cathodic protection devices and coatings.

D. **Oil Drilling and Workover Facilities** N/A wells feeding this facility are located offshore.

1. A blowout preventer (BOP) assembly and well control system is installed before drilling below any casing string and, as required during workover operations. ________
2. The BOP assembly is capable of controlling any expected wellhead pressure. ________
3. Casing and BOP installations conform to state regulations. ________

Name of facility ____________________

Operator ____________________

(Prior to completing Part I, refer to regulations and instructions page 5.)

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN

PART I
GENERAL INFORMATION

1. **Name of facility** Facility #3
2. **Type of facility** ONSHORE PRODUCTION FACILITY
3. **Location of facility**
4. **Name and address of owner or operator:**

Name

Address

5. **Designated person accountable for oil spill prevention at facility:**

Name and title Production Superintendent

6. **Facility experienced a reportable oil spill event during the twelve months prior to Jan. 10, 1974 (effective date of 40 CFR, Part 112). (If YES, complete Attachment #1.)** No.

MANAGEMENT APPROVAL

This SPCC Plan will be implemented as herein described.

Signature

Name

Title

CERTIFICATION

I hereby certify that I have examined the facility, and being familiar with the provisions of 40 CFR, Part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Printed Name of Registered Professional Engineer

(Seal)

Signature of Registered Professional Engineer

Date July 1, 1974

Registration No. **State**

(Part I) Page 1 of 3

PART I
GENERAL INFORMATION

7. Potential Spills — Prediction & Control:

Source	Major Type of Failure	Total Quantity (bbls)	Rate (bbls/hr)	Direction of Flow*	Secondary Containment
Top allowable flowing Well	Flowline Break	70	8.7	South	Not Practical

Discussion: The above prediction is based on a complete (100 percent) flowline break at the beginning of an 8-hour unattended period. This complete flowline break would more than likely have to be caused by some outside source (bulldozer, etc.) and therefore, would not occur during the unattended period. Normally a flowline leak would be a small pin hole which would release only a small fraction of the oil indicated above and would be located and repaired before the 8 hours had elapsed. Any oil lost in the above situation would be isolated and picked up by a vacuum truck within a few hours of discovery.

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*Attach map if appropriate.

Name of facility ______________________

Operator ______________________

PART I
GENERAL INFORMATION

[Response to statements should be: YES, NO, or NA (Not Applicable).]

8. Containment or diversionary structures or equipment to prevent oil from reaching navigable waters are practicable. (If NO, complete Attachment #2.) Yes

9. **Inspections and Records**
   A. The required inspections follow written procedures. Yes
   B. The written procedures and a record of inspections, signed by the appropriate supervisor or inspector, are ~~attached~~ filed at office. Yes
   Discussion:

10. **Personnel, Training, and Spill Prevention Procedures**
   A. Personnel are properly instructed in the following:
   (1) operation and maintenance of equipment to prevent oil discharges, and Yes
   (2) applicable pollution control laws, rules, and regulations. Yes
   Describe procedures employed for instruction: All employees have been instructed in spill prevention and are periodically refreshed as to procedures, and furnished copies of laws and regulations.

   B. Scheduled prevention briefings for the operating personnel are conducted frequently enough to assure adequate understanding of the SPCC Plan. Yes
   Describe briefing program: New employees are briefed as to the importance of spill prevention and periodic briefings will be scheduled.

Name of facility

Operator

(Prior to completing Part II, Alternate B, refer to regulations and instructions page 7.)

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

A. Facility Drainage

1. Drainage from diked storage areas is controlled as follows (include operating description of valves, pumps, ejectors, etc.): Oil and water within the diked storage area is picked up by a stationary gas operated pump or portable pump powered by an Internal combustion engine and recycled through gun-barrels and stock tanks.

2. The procedure for supervising the drainage of rain water from secondary containment into a storm drain or an open watercourse is as follows (include description of (a) inspection for pollutants, and (b) method of valving security). (A record of inspection and drainage events is to be maintained on a form similar to Attachment #3): No Drainage.

3. Field drainage ditches, road ditches, and oil traps, sumps, or skimmers, if such exist, are inspected at regularly scheduled intervals for accumulations of oil. Yes
Describe inspection procedures, intervals, and methods employed to remove oil: The ditches are under daily surveillance. If an accumulation occurs, oil is picked up by vacuum truck.

B. Bulk Storage Tanks

1. Describe tank design, materials of construction, and fail-safe engineering features:

BATTERY #1 4 - 1,000 bbl bolted galvanized tanks for oil storage
4 - 500 bbl bolted galvanized tanks for condensate storage
2 - 1,500 bbl bolted galvanized salt water settling tanks
1 - 1,000 bbl bolted galvanized oil gun-barrel
1 - 400 bbl bolted galvanized condensate gun-barrel
1 - 300 bbl bolted galvanized test gun-barrel
1 - 300 bbl welded test tank
All storage tanks have overflow lines to other tanks and are protected by Pressure/Vacuum thief hatches and by Vapor Recovery valves.
BATTERY # 2 — 3 - 300 bbl welded tanks for oil storage are protected by Pressure/Vacuum thief hatches.

Name of facility ______________________

Operator ______________________

PART II, ALTERNATE B
DESIGN AND OPERATING INFORMATION
ONSHORE OIL PRODUCTION FACILITY

[Response to statements should be: YES, NO, or NA (Not Applicable).]

2. Describe secondary containment design, construction materials, and volume: Tank batteries are protected with firewalls of impervious material of sufficient volume to contain more than the volume of the largest tank with an ample allowance for precipitation.

   BATTERY #1 Firewall measures 185' X 285' X 4' calculated to hold 37,593 bbls.

   BATTERY #2 Firewall measures 60' X 140' X 4" calculated to hold 5,989 bbls.

3. Describe tank examination methods and procedures: Tanks are examined externally frequently by production foreman. Internal examination is made during tank cleaning process. Expert personnel are consulted if condition of tank is questionable.

C. Facility Transfer Operations

1. Describe scheduled basis for examinations of above-ground valves and pipelines and salt water disposal facilities: Transfer valves and pipelines are visible at all times and are inspected daily. Salt water disposal facility is checked frequently.

2. Describe flowline maintenance program to prevent spills: All flowlines are protected against corrosion by wrapping and doping or plastic coating.

D. Oil Drilling and Workover Facilities

1. A blowout preventer (BOP) assembly and well control system is installed before drilling below any casing string and, as required during workover operations.	Yes
2. The BOP assembly is capable of controlling any expected wellhead pressure.	Yes
3. Casing and BOP installations conform to state regulations.	Yes

Name of facility

Operator

Reproduced from best available copy.

APPENDIX D. SAMPLE OF EXISTING SPCC PLANS FOR THE PENN-GRADE REGION

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN FOR PRODUCTION FACILITIES

Section 311 (j) (1) (C) of the Federal Water Pollution Control Act Amendments of 1972, authorized the President to issue regulations establishing procedures, methods, equipment and other requirements to prevent discharges of oil and hazardous substances from vessels and from onshore facilities and offshore facilities, and to contain such discharges. The President delegated the responsibility for such regulations to the Administrator of the Environmental Protection Agency. Accordingly, the Administrator developed and promulgated Oil Pollution Prevention regulations in 40 CFR Part 112. These regulations require owners and operator of onshore and offshore no-transportation related facilities to develop and implement Spill Prevention Control and Countermeasure (SPCC) Plans to prevent the discharge of oil into the navigable waters of the United States or adjoining shoreline.

GENERAL INFORMATION

1. Name and location of facility:

Name ______ Well Number(s) 3

Location:

Direction and distance to nearest town ______

Permit No.(s) ______ Lot or Section ______ Twp. ______

County Mason State West Virginia District: ______

(One topographical map of each operating area suggested)

2. Name, address and phone number of owner or operator:

Name ______

Address:

Street ______ State Ohio

City ______ Zip 45714 County ______

Telephone No. ______

3. Name or title and telephone number of person in charge of facility:

Name or title ______ Telephone ______

4. Name and telephone number of person responsible for oil spill prevention at facility:

Name ______ Telephone ______

CERTIFICATION

I hereby certify and attest that I am familiar with the facility and the information contained in this plan and that to the best of my knowledge and belief such information is true, complete and accurate, and this plan has been prepared in accordance with good engineering practices.

Printed name of Registered Engineer Signature of Registered Engineer

Date: Registration No.: ______

SPILL RECORD

	Yes	No
1. This facility, over the past 12 months, has had a reportable spill.		X

2. Descriptions of any reportable spills are given below, including corrective action taken and plans for preventing recurrence.

PREDICTION OF POTENTIAL SPILLS

1. Name of lease(s): ____________

2. Nearest watercourse:

   A. Name: Ohio River

   B. Distance and direction from facility: ____________

3. Possible spill sources: (such as overflow, rupture or leakage)

Source	Type of Failure	Maximum Volume (bbls.)	Maximum Flow Rate (bbls./hr.)	Direction of Flow
Wellhead Controls	Rupture or leakage	10 bbls day	10 bbls day	
Flowlines	Rupture or leakage	10 bbls day	10 bbls day	
Storage Tanks	Rupture, leakage or overflow		N/A	

*Important – Advance planning for wells located in flood plains and/or watershed areas should receive special consideration.

SPILL PREVENTION PLAN CHECKLIST

1. Secondary containment and/or diversionary structures will be used for possible spill sources:

Source	Type of Containment or Diversionary Structure
Wellhead Controls	None
Flow lines	None
Storage Tanks	Retention pond

Select from:
Onshore: Dikes, berms, retaining walls; curbing; culverting, gutters, drains; weirs, booms, other barriers, spill diversion and retention ponds.

2. If containment or diversionary structures will be impracticable, state reasons for impracticability:

Small production on a daily basis makes containment structures for wellhead and flowlines uneconomical.

and attach a strong oil spill contingency plan and written commitment of manpower, equipment and materials required to expeditiously control and remove any harmful quantity of oil discharged Check if attached:

Contingency Plan X   Written Commitment X

Discussion: Contingency plan is contained in the action plan on page 6 .

3. Onshore Oil Production Facilities

A. Drainage:

(1) Drains of secondary containment shall be closed and sealed except when rainwater is drained.

Discussion: No drains in retention pond. In event of spill, oil will be pumped into storage tanks or tank truck from retention pond. In event retention pond fills up with rainwater, etc., same will be picked up by vacumn truck or pumped into tank truck and disposed of.

(2) Drainage from secondary containment shall be conducted under surveillance of authorized person. (Name or title of authorized person Well tender)

Discussion: , will be notified whenever retention pond needs to be drained and will drain same with its own equipment or by use of a subcontractor, but under supervision.

(3) Field drainage ditches, road ditches and oil traps or skimmers shall be inspected on a scheduled, periodic basis for oil accumulations.
How often Every other day or whenever well is pumped

Discussion:

(4) Any oil removed from secondary containment, ditches, traps or skimmers shall be disposed of in an approved manner.

Discussion: Oil will be pumped back into the lease storage tanks

B. Bulk Storage Tanks:

(1) Tank material and construction comply with conditions of storage and material to be stored.

Discussion: All tanks are of standard construction for oil storage use.

(2) Secondary containment volume (200 bbls) is greater than the largest single tank capacity.

Discussion: Retention pond is at least twice as big as largest single tank and at least as large as the total capacity of all the storage tanks on the lease.

(3) Undiked areas drain to a catchment basin or holding pond with a volume of 200 bbls .

Discussion: Same retention pond is used where possible. This is the only retention pond or catchment basin on lease.

(4) All tanks shall be visually inspected on a periodic basis. (Maintaining a written record of inspection is suggested.)

Discussion: Monthly inspection to be completed on or before last day of month & so indicated on written report mailed to Oil & Gas Corp., P.O.Box , , Ohio, , on or before the tenth (10th) day of the month following the inspections.

(5) Tanks are engineered with one or more of the following fail-safe devices:

a. Adequate tank capacity to prevent overfill
b. Overflow equalizing lines
c. Adequate vacuum protection
d. High level sensors

Discussion: All storage tanks are of 100 bbl capacity and whenever a second tank is joined as a tank battery, an equalizing overflow line will be installed.

C. Intra-facility Transfer Operations:

(1) Aboveground valves and pipelines shall be inspected on a scheduled, periodic basis of every other day or whenever well is pumped.

Discussion:

(2) Salt water disposal facilities shall be inspected on a periodic basis of monthly

Discussion: To be inspected on or prior to the last day of each month

(3) Records of flowline repairs shall be maintained and used in a maintenance and replacement program.

Discussion: Oil & Gas Corp. will make all necessary repairs after being notified by well tender

4. Inspections and Records

A. The required inspections follow written procedures.

Discussion: Inspections are to be visual and any leaks, severly rusted pipe, fittings or connections or any potential spill sources are to be reported to Oil & Gas Corp. within 24 hrs.

B. The written procedures and a record of inspections shall be signed by the appropriate supervisor.

Discussion: Written inspections are to be mailed to Oil & Gas Corp. as outlined under Item B-4, page 4, and other written inspections are to be mailed to Ramco with weekly meter or pumper reports. Inspections locating spills are to be reported immediately, and inspections locating potential spills are to be reported within 8 hours, both being reported to

5. Personnel, Training and Spill Prevention Prodecures

A. Personnel shall be properly instructed in the following:

(1) Operation and maintenance of equipment to prevent oil discharges, and
(2) Applicable pollution control laws, rules and regulations.

B. Spill prevention briefings for the operating personnel shall be conducted on a scheduled, periodic basis of annually

Discussion: There will be an EP-SPCC meeting for all personnel every December in the office of Oil & Gas Corp.

6. ACTION PLAN (suggested plan outline to be used if your spill should reach water)

A. Action Center (the location or center that direction for the cleanup and containment operation will issue from)

Name Oil & Gas Corp. Street ____________
City ____________ State Ohio
Telephone ____________

B. Communication

(1) Federal EPA	AC 215	597-9898
(2) W.Va. Water Resources Division	AC 304	348-2107
(3) U. S. Coast Guard - Capt. of the Port, Huntington, W.Va.	AC 304	675-3160
Capt. of the Port, Pittsburgh, Pa.	AC 412	741-4174
(4) Local Fire Dept.	AC304	675-1410

C. Immediate Work Force

(1) List names and telephone numbers of your own people that would be immediately available to you on a 24 hour basis.

(2) List your own equipment, such as dozers, trucks, etc., that would be immediately available to you on a 24 hour basis.

None

(3) List men and equipment that a sub-contractor could make immediately available to you on a 24 hour basis, also list the telephone numbers of the people to call.

Oil & Gas Corp.

2 bulldozers - 3 trucks - 3 pumps and suction lines - assorted picks, shovels, hoes

D. Standby Work Force:

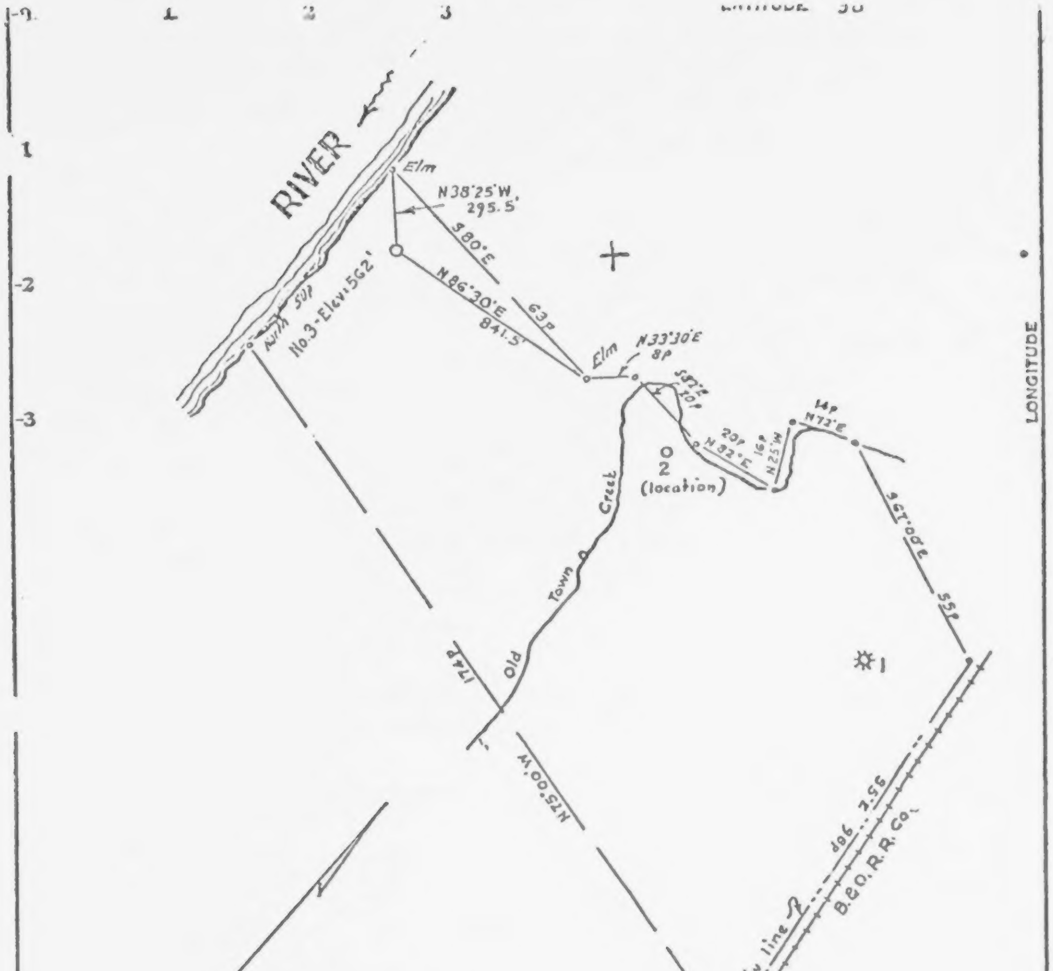
List additional or standby men and equipment, along with telephone numbers, in the event that additional service is needed.

Well Services - small tools, absorbent materials, lab
- Pump trucks, absorbent materials, lab emulsifiers, detergents, foams

E. Clean Up Materials:

List the availability of materials that may be needed in a clean-up operation such as straw, sawdust, sand, etc.

Straw, sawdust and other absorbent materials are kept at Oil & Gas Corp. shop in , Ohio,



LATITUDE 38
1
2
3
1
-2
-3
RIVER
Elm
N38°25'W.
295.5'
S80°E
63P
N86°30'E
841.5'
No.3-Elev.562'
50P
Elm
N33°30'E
8P
30P
20P
N82°E
16P
N25°W
14P
N72°E
2
(location)
Old Town Creek
174P
N75°00'W
55P
1
R/W line
B.&O. R.R. Co.
LONGITUDE

Appendix 2 - Representative SPCC Plan (Pennsylvania)

SPILL PREVENTION CONTROL & COUNTERMEASURE PLAN FOR PRODUCTION FACILITIES

Section 311 (j) (1) (C) of the Federal Water Pollution Control Act Amendments of 1972, authorized the President to issue regulations establishing procedures, methods, equipment and other requirements to prevent discharges of oil and hazardous substances from vessels and from onshore facilities and offshore facilities, and to contain such discharges. The President delegated the responsibility for such regulations to the Administrator of the Environmental Protection Agency. Accordingly, the Administrator developed and promulgated Oil Pollution Prevention regulations in 40 CFR Part 112. These regulations require owners and operator of onshore and offshore no-transportation-related facilities to develop and implement Spill Prevention Control and Countermeasure (SPCC) Plans to prevent the discharge of oil into the navigable waters of the United States or adjoining shoreline.

GENERAL INFORMATION

1. Name and location of facility:

Name________________________ Well Number (s)#2
Location:
Direction and distance to nearest town 2 Miles South of
Permit No.(s)__________ Lot or Section________ Twp.__________
County__________ State Ohio
(One topographical map of each operating area suggested)

2. Name, address and phone number of owner or operator:

Name________________________
Address:
Street__________________ State Ohio
City__________________ Zip______ County__________
Telephone No. ____ ________ ____

3. Name or title and telephone number of person in charge of facility:

Name or title__________________ Telephone: ____ __________

4. Name and telephone number of person responsible for oil spill prevention at facility:

Name__________________ Telephone:____ __________

CERTIFICATION

I hereby certify and attest that I am familiar with the facility and the information contained in this plan and that to the best of my knowledge and belief such information is true, complete and accurate, and this plan has been prepared in accordance with good engineering practices.

REGISTERED ARCHITECT

Printed name of Registered Engineer

Signature of Registered Engineer
Registration No.:__________

SPILL RECORD

		Yes	No
1.	This facility, over the past 12 months, has had a reportable spill.		X

2. Descriptions of any reportable spills are given below, including corrective action taken and plans for preventing recurrence.

PREDICTION OF POTENTIAL SPILLS

1. Name of lease (s): #2 Well

2. Nearest watercourse:

A. Name:

B. Distance and direction from facility: 1500 Feet.

3. Probable spill sources: (such as overflow, rupture or leakage)

Source	Type of Failure	Maximum Volume (bbls.)	Maximum Flow Rate (bbls./hr.)	Direction of Flow
Wellhead Controls	Rupture or Leakage	5/day	Same	W - SW
Flowline	"	"	"	"
Storage Tank	Rupture or Leakage or Overflow	200/day	N/A	"

* Important - Advance planning for wells located in flood plains and/or watershed areas should receive special consideration.

SPILL PREVENTION PLAN CHECKLIST

1. Secondary containment and/or diversionary structures will be used for possible spill sources:

Source	Type of Containment or Diversionary Structure
Wellhead Controls	None
Flow Line	None
Storage Tank	Retention Pond

Select from:
Onshore: Dikes, berms, retaining walls; curbing; culverting, gutters, drains; weirs, booms, other barriers, spill diversion and retention ponds.

If containment or diversionary structures will be impracticable, state reasons for impracticability Small production on a daily basis from the well makes containment structures for wellhead and flow line uneconomical.

and attach a strong oil spill contingency plan and written commitment of manpower, equipment and materials required to expeditiously control and remove any harmful quantity of oil discharged. Check if attached:

Contingency Plan X Written Commitment ____________

Discussion: Contingency plan is contained in the action plan on Page 5.

3. Onshore Oil Production Facilities

	Yes	No
A. Drainage:		
(1) Drains of secondary containment shall be closed and sealed except when rainwater is drained.	X	
(2) Drainage from secondary containment shall be conducted under surveillance of authorized person. (Name or title of authorized person Pumper)	X	
(3) Field drainage ditches, road ditches and oil traps or skimmers shall be inspected on a scheduled, periodic basis for oil accumulations. How often daily	X	
(4) Any oil removed from secondary containment, ditches, traps or skimmers shall be disposed of in an approved manner.	X	

Discussion: ____________

	Yes	No
B. Bulk Storage Tanks:		
(1) Tank material and construction comply with conditions of storage and material to be stored.	X	
(2) Secondary containment volume (____) is greater than the largest single tank capacity.	X	
(3) Undiked areas drain to a catchment basin or holding pond.	X	
(4) All tanks shall be visually inspected on a periodic basis (Maintaining a written record of inspection is suggested)	X	
(5) Tanks are engineered with one or more of the following fail-safe devices:		
a. Adequate tank capacity to prevent overfill	X	
b. Overflow equalizing lines		X
c. Adequate vacuum protection	X	
d. High level sensors where facilities are part of computer production control system		

Discussion:

C. Intra-facility Transfer Operations:

	Yes	No
(1) Aboveground valves and pipelines shall be inspected on a scheduled, periodic basis of DAILY		
(2) Salt water disposal facilities shall be inspected periodically.	X	
(3) Records of flowline repairs shall be maintained and used in a maintenance and replacement program.	X	

Discussion:

4. Inspections and Records

A. The required inspections follow written procedures	X	
B. The written procedures and a record of inspections shall be signed by the appropriate supervisor.	X	

Discussion:

5. Personnel, Training, and Spill Prevention Procedures

A. Personnel shall be properly instructed in the following:

(1) Operation and maintenance of equipment to prevent oil discharges, and	X	
(2) Applicable pollution control laws, rules, and regulations.	X	
B. Spill prevention briefings for the operating personnel shall be conducted on a scheduled, periodic basis	X	

Discussion:

6. **ACTION PLAN** (suggested plan outline to be used if your spill should reach water)

A. **Action Center** (the location or center that direction for the cleanup and containment operation will issue from)

Name Oil Company Street ____________

City ____________ State Ohio

Telephone ____ ____________

B. Communication

(1) Federal EPA	AC 216	333-7556
(2) State EPA	AC 614	299-6336 (Emergency No.)
(3) USCG	AC 216	522-3983

(4) Local Fire Dept. ____________

C. Immediate Work Force

(1) List names and telephone numbers of your own people that would be immediately available to you on a 24 hour basis.

(2) List your own equipment, such as dozers, trucks, etc., that would be immediately available to you on a 24 hour basis.

Pick-up Truck
Assorted shovels, picks, hoes - Field Office

(3) List men and equipment that a sub-contractor could make immediately available to you on a 24 hour basis, also list the telephone numbers of the people to call.

Hauling (Back hoes, Trucks)
Tractor Service (Tractors, Trucks, Back Hoes)

D. Standby Work Force

List additional or standby men and equipment, along with telephone numbers, in the event that additional service is needed.

See #1 and #3

E. Clean Up Materials

List the availability of materials that may be needed in a clean-up operation such as straw, sawdust, sand, emulsifiers, detergents, foams, etc.

Straw, sawdust, sand kept at Field Office in Ohio

APPENDIX E. GENERIC SPCC PLANS FOR THE TEXAS/OKLAHOMA REGION

Plan 5-1

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name of Facility______________________________
Type of Facility Oil Well (Two)
Location of Facility____________________________

2. Company Information

Name of Company______________________________
Address____________________________________
Phone Number________________________________
Owner_____________________________________
Person Responsible for SPCC Plan________________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hr.)
Federal EPA Office: Phone #__________Location__________
State Pollution
Control Office: Phone #__________Location__________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility & Drainage

This lease handles flow from two wells producing a total of 75 bpd of oil and about 25 bpd of salt water. A sketch attached hereto shows the layout of this facility. Land is nearly flat, and the territory is arid with less than 20 inches of rain per year. There are no brooks or streams within several miles.

Oil flows to a gunbarrel tank outside existing firewall and from gunbarrel to salt water (75bbl) or oil tanks (500 bbl). Both salt water and oil are picked up by truck.

6. Containment

a. Existing
Existing containment consists of only the fire wall around the salt water and oil tanks.

b. Proposed

Consistent with the Oil Spill Prevention regulation 40 CFR 112.7 (e) 2 ii, proposed containment will be an 8" high earthen dike with capacity > 500 bbl around wells, gunbarrel, fire wall and access road as shown. A minimum amount of grading will conduct all spills and leaks from wells, piping and gunbarrel to sump in lower corner. A ramp will be built over the access road to prevent a low spot in the secondary dike.

7. Transfer Operations

Oil and salt water are picke up from inside the secondary dike so there is no danger of pollution leaving the lease area.

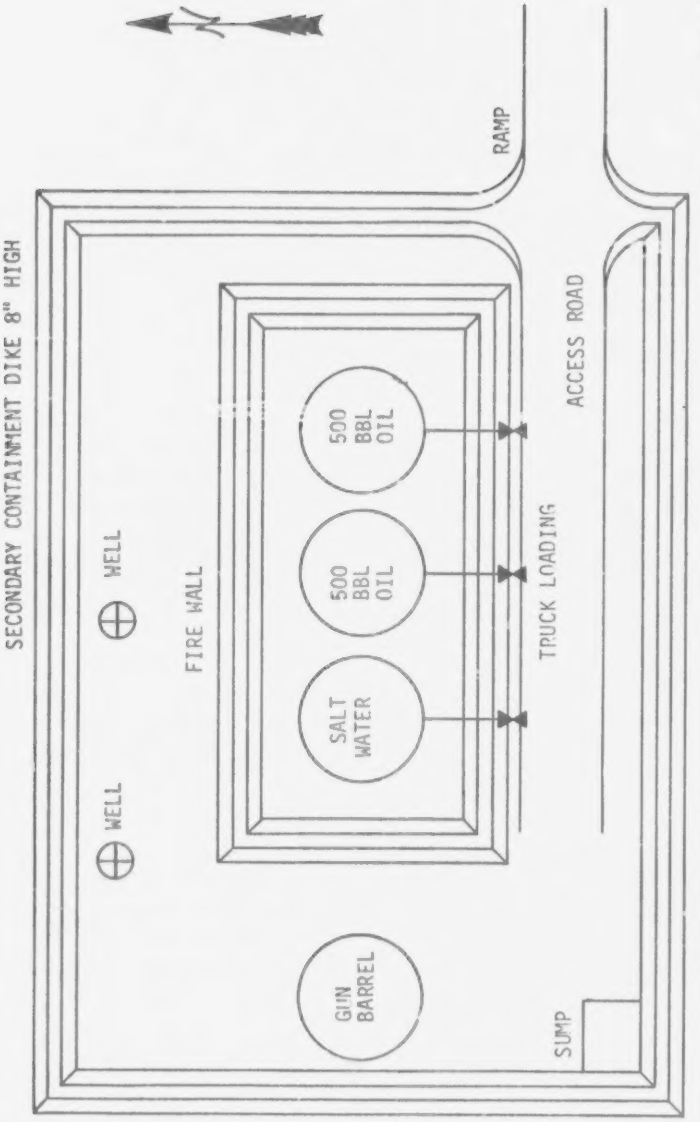
8. Inspection and Training

A daily visual inspection is made of all facilities by the pumper for signs of leaks, spills, corrosion, etc. Any repairs or replacements found necessary will be made promptly and the area cleaned up. Spilled oil will be removed, stored in drums for disposal by a waste oil dealer or re-entered into the product line. The pumper is experienced in oil field operations and is familiar with SPCC Plan. Formal training or briefing sessions on spill prevention are held twice a year.

9. Certification

I hereby certify that this plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

Name (Print)______________________________
Registration Number________________________
State____________________________________
Signature________________________________
Date_____________________________________


SECONDARY CONTAINMENT DIKE 8" HIGH
WELL
WELL
FIRE WALL
GUN BARREL
SALT WATER
500 BBL OIL
500 BBL OIL
TRUCK LOADING
ACCESS ROAD
RAMP
SUMP

TEXAS NEARLY FLAT TERRAIN.
EVAPORATION NEARLY EQUAL TO
RAINFALL.

IF GROUND SLOPES TO THE SOUTH
THE SECONDARY DIKE IS NOT REQUIRED
ALONG THE NORTH SIDE.

ESTIMATED COST OF IMPROVEMENTS

Dike, 400 L.F. @ 1.05	$ 420.00
Grading 4000 S.Y. @ .50 S.Y. (Machine)	2000.00
	$2420.00
Fence, if required, 400 L.F. @ 4.00	$1600.00 (optional)

APPENDIX F. GENERIC SPCC PLANS FOR THE LOUISIANA REGION

Plan 6-1

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name or Number________________________________
Type___Oil Production/Storage___________________
Location______________________________________

2. Company Information

Name of Company_______________________________
Address_______________________________________
Phone Number__________________________________
Owner____
Person Responsible for SPCC Plan________________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hrs.)
Federal EPA Office: Phone #__________Location________
State Pollution
Control Office: Phone #__________Location________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility and Drainage

This lease handles the flow from two wells classified as oil wells. Total production from this facility is 100 bpd of oil and 35 bpd of salt water and a small amount of gas sufficient to operate the heater treater. A sketch attached hereto shows the layout of this facility. Equipment consists of heater treater, low pressure separator, one 500 bbl salt water storage vessel and four 500 bbl oil storage vessels and salt water pump for disposal to injection well. The terrain is completely flat and drainage from lease is to the north west corner where it flows into a roadside ditch for about 1/2 miles to a drainage canal.

The well is operated by the company's own employee and is visited several times each day. The well stream flows to a heater treater for separation after which the oil flows to its storage vessel and the salt water to another vessel. The gas is piped to a low pressure separator and subsequently used for operating the heater treater. The salt water collected in the storage tank is pumped to a disposal well and the oil is collected by truck and delivered to the customer.

6. Containment and Drainage

A small firewall around the tanks will contain minor leaks and spills, however, it does not have enough volume to contain a single tank.

A secondary containment dike is constructed around the entire lease as shown in the enclosed schematic drawing. Its height is 18 inches and will contain a spill of 1300 bbls. The diked area is sufficiently impervious to contain spilled oil. A pipe and valve leading to the drainage ditch is used for disposing of the contents of the secondary containment dike after the fluid has been tested for clarity, oil and salt water content. This valve is locked. A ramp for entrance of vehicles is provided at roadway to maintain integrity of secondary dike. Area will be graded to drain to sump and discharge valve.

7. Transfer Operations

Oil is picked up from storage tanks by truck at point shown on sketch. This is outside firewall dike but inside secondary dike.

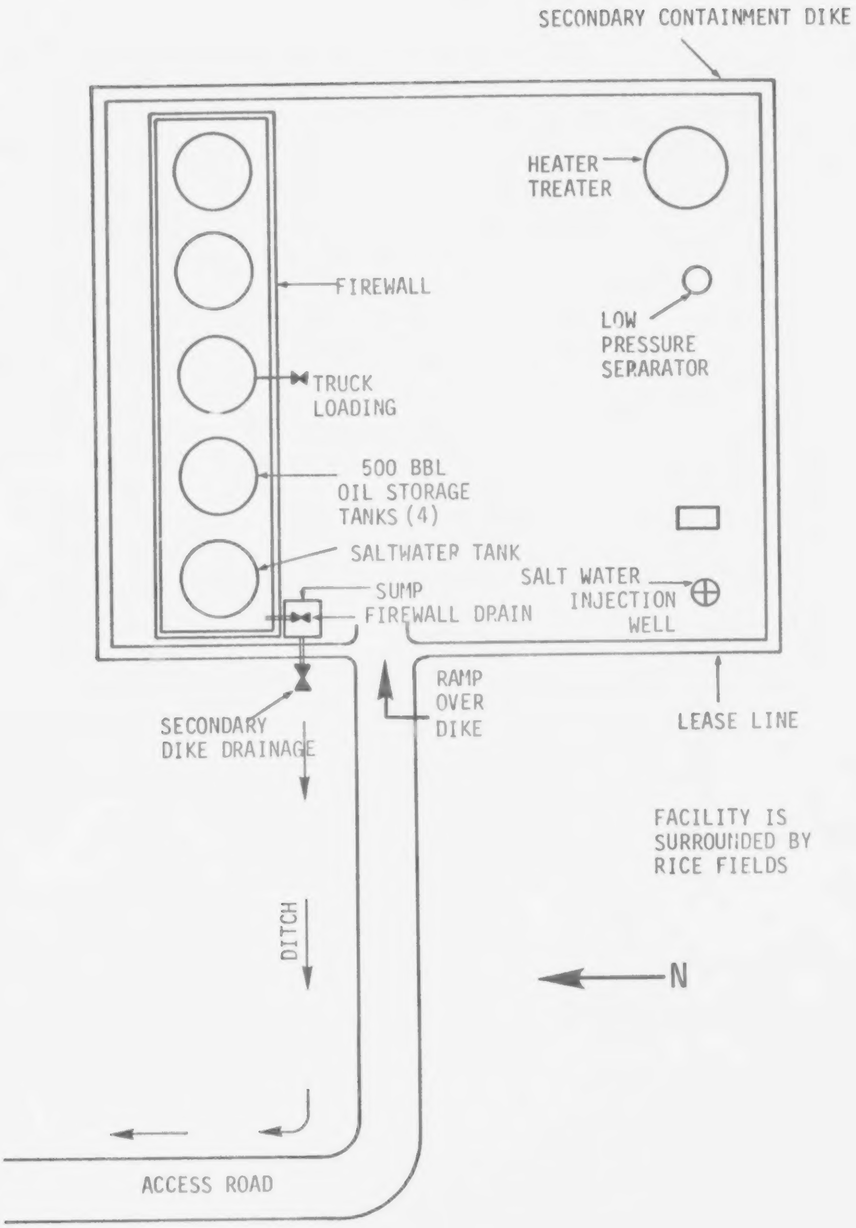
8. Inspection and Training

A daily visual inspection is made of all facilities by the pumper for signs of leaks, corrosion, etc. All repairs and/or replacements are promptly made and the area cleaned up. Material from spills or leaks is stored in drums for disposal by a waste oil dealer or re-entered into the product line. The pumper is experienced in oil field operations and is familiar with the SPCC plans; however, formal training and briefings concerning spill preventive practices are held twice a year.

9. Certification

I hereby certify that this plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112

Name (Print)____
Registration No.____________________________________
State____
Signature____
Date____


SECONDARY CONTAINMENT DIKE
HEATER TREATER
FIREWALL
LOW PRESSURE SEPARATOR
TRUCK LOADING
500 BBL OIL STORAGE TANKS (4)
SALTWATER TANK
SUMP
SALT WATER INJECTION WELL
FIREWALL DRAIN
RAMP OVER DIKE
SECONDARY DIKE DRAINAGE
LEASE LINE
FACILITY IS SURROUNDED BY RICE FIELDS
DITCH
N
ACCESS ROAD

COST ESTIMATE FOR IMPROVEMENTS

900 L.F. Secondary Dike (Mach.) .40 L.F.	$ 360.00
4" Valve and 12' of 4" Pipe at Sump	334.00
Access Ramps to Sump	150.00
Grading Area to Sump	1000.00
	$1844.00

Plan 6-2

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name of Facility______________________________
Type of Facility______________________________
Location of Facility__________________________

2. Company Information

Name of Company______________________________
Address____________________________________
Phone Number________________________________
Owner______________________ ________________
Person Responsible for SPCC Plan________________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hr)
Federal EPA Office: Phone #__________Location__________
State Pollution
Control Office: Phone #__________Location__________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility

This well is classified as a gas well, producing 600 MCF/day of gas and approximately 200 bpd of oil and 5 bpd of salt water. The equipment consists of the following: Gunbarrel tank, separator, glycol unit, one 500 bbl API salt water tank and two 500 bbl API oil storage tanks. The entire facility has been placed on timber piles and located in the bayou about 80 feet from the shore line (marsh) as shown in the sketch attached hereto. The well stream flows through a low pressure separator followed by a glycol unit and into the gas pipe line. The liquid component of the well stream leaves the separator and flows into a gunbarrel tank.

which separates the oil from the water. The oil and water then flow to their respective storage tanks.

The oil storage tanks are interconnected at the top by piping and valves to prevent spill over. The oil flows by gravity from these tanks through a pipeline through normally locked valves to an oil loading pier and into a barge. The salt water is also pumped to a barge for storage and eventual disposal since this facility is located in a fresh water area.

Since this facility is located entirely on the water, any spill is immediately in a navigable waterway. Secondary containment of a spill by the use of dikes is impossible.

6. Containment and Drainage

a. Existing

A sump box which is drained by gravity to a disposal pit is located at the end of the oil loading pier. The oil discharge hose is covered by a blind flange and is kept in the sump box when not in use. The two concrete pads containing the storage vessels and related equipment have six-inch-high curbing. This curbing contains small leaks (total capacity < 500 bbl), which are drained directly to a disposal pit. However, there is no protection from a tank (500 bbl) rupture or leaks in the pipes located below the walkway, or in the lines leading to facility from the well or loading piers.

Secondary containment of capacity > 500 bbl will be constructed around the gunbarrel tank and storage tanks. The diked area will be sufficiently impervious to contain oil spills.

b. Proposed

(1) We will provide a 500-gallon sump tank under each platform to catch BS&W, small leaks and rain water, and install drip pans under all above-water piping, drip pans to drain to one of the sump tanks.

(2) We will discontinue use of the disposal pit except in emergencies.

(3) We will install gas-operated pumps at sumps and recirculate all liquids through the gunbarrel — thus creating a completely closed system.

(4) We will install a floating boom around the entire pier assembly, including well and loading pier, to contain leaks from pipes located directly over the water or overflow from sumps. Any pollution in this area will be skimmed as soon as it occurs.

(5) In the event of a major spill or tank rupture, the boom will be disconnected from around the pier and deployed downstream of the facility to contain the spill. A cleanup contractor will be called immediately to remove the spilled oil.

7. Inspection and Training

A contract pumper, who is familiar with this plan and trained in the use of the facility equipment, is responsible for the operation of the facility. Daily visual inspection of the entire facility is part of his routine duties. Any leaks or malfunctions in the equipment are repaired or replaced promptly. Training on spill prevention and cleanup is given twice a year.

8. Certification

I hereby certify that this plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

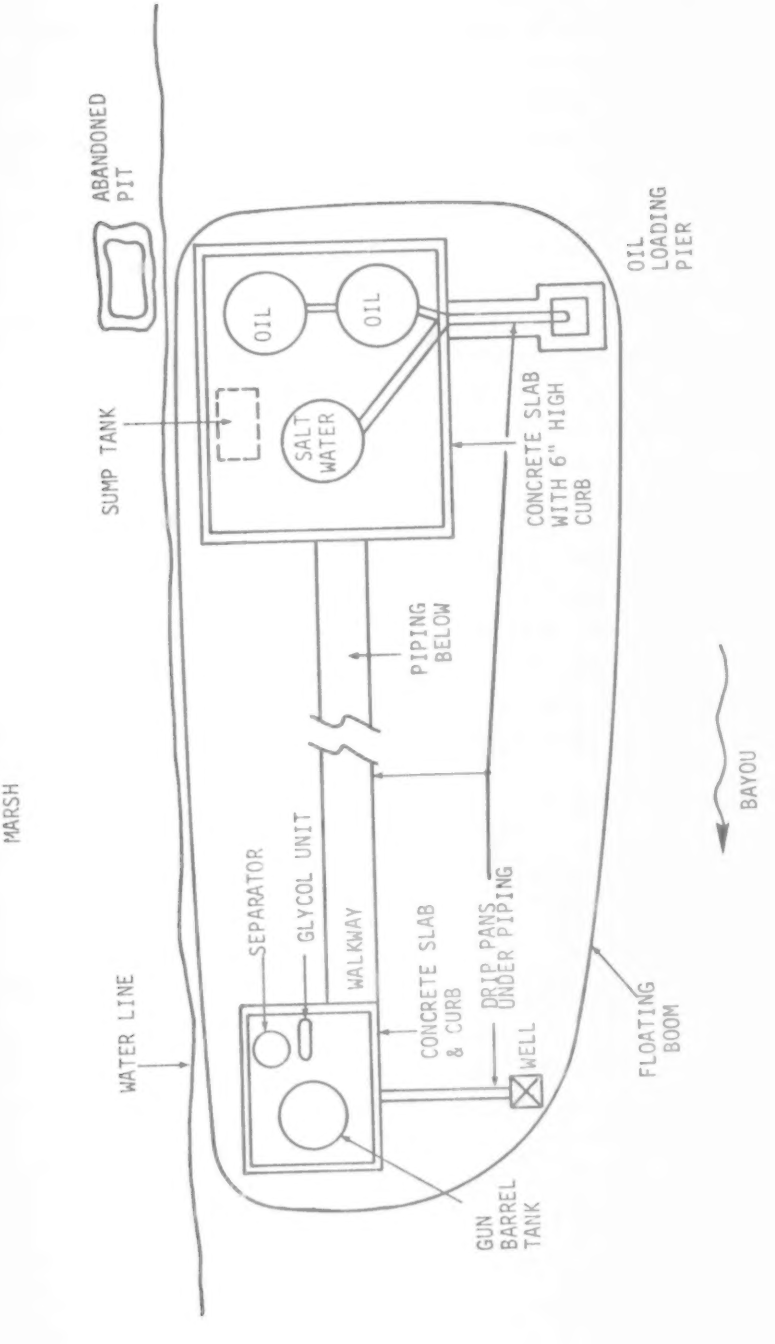
Name (Print)____________________________________

Registration No.________________________________

State____

Signature_______________________________________

Date ____


ABANDONED PIT
SUMP TANK
OIL
OIL
SALT WATER
OIL LOADING PIER
CONCRETE SLAB WITH 6" HIGH CURB
PIPING BELOW
BAYOU
MARSH
SEPARATOR
GLYCOL UNIT
WALKWAY
CONCRETE SLAB & CURB
DRIP PANS UNDER PIPING
WELL
WATER LINE
FLOATING BOOM
GUN BARREL TANK

COST ESTIMATES FOR IMPROVEMENTS

Floating Boom 500 L.F. @ $12.00	$ 6000.00
Drip Pans Well & Loading Pier 140 L.F. @ 3.50	490.00
Drip Pans Under Walkway 250 L.F. @ 7.00	1750.00
2 Sump Tanks Installed $1000 Each	2000.00
Pumps & Piping Sump to Gunbarrel Tank Pumps 2 @ 350.00, Pipe 300 L.F. of 4" @ 7.00.	2800.00
Staging & Delivery of Material	1200.00
Travel and Efficiency 30% of Labor	2330.00
	$16570.00

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

   Name of Facility____
   Type of Facility____
   Location of Facility____________________________________

2. Company Information

   Name of Company____
   Address____
   Phone Number____
   Owner____
   Person Responsible for SPCC Plan________________________

3. List of Agencies to Notify in Case of Spill

   U.S.C.G. National Response Center (800) 424-8802 (24hr.)
   Federal EPA Office: Phone #__________Location__________
   State Pollution
   Control Office: Phone #__________Location__________

4. Spill History

   This facility has experienced no spills since January 10, 1973.

5. Description of Facility

   This well is classified as an oil well producing 70 bbls/day of oil, a small amount of gas (100 MCF/day) and no salt water. The equipment used at this facility includes the following: Line heater, separator, glycol unit, low pressure water knockout unit and two 500 bbl API oil storage tanks. This equipment is shown schematically in the attached sketch.

   This facility is operated by a contract pumper who visits the site once or twice a day. The well is located in a bayou about 100 feet from shore and a well stream of about 3 bbls/hour flows through the line heater to the onshore separator. Gas flows through the glycol unit to the product line whereas the oil flows to the low pressure water knock-out to the oil storage tank. The oil storage tanks are connected at the top by pipe and valve to prevent spill over. The oil flows by gravity from the tanks to the oil loading pier where it is loaded into a barge for customer delivery.

This facility is located in the marsh land adjacent to a bayou. Any spill from this facility immediately becomes a spill event. The natural drainage from this facility is directly into a navigable stream and secondary containment is nearly impossible because of the lack of available material to construct the dike and a firm foundation on which to install the dike.

6. Containment and Drainage

a. Existing

A sump box is located at the oil loading pier and is drained via pipe to the interior of the tank dike. The oil discharge hose is covered with a blind flange and kept in the sump box when not in use. A six inch high concrete curb extends around the oil storage tanks to contain small leaks (<100 bbls). In addition, an earthen dike has been constructed around the oil tanks and is sufficiently impervious to contain the contents of one of these tanks in the event of a large spill (≈500 bbls). However, in the case of a tank rupture, this dike will probably be breached. The contents of this dike are piped through a normally closed valve to a disposal pit, which will be discontinued.

b. Proposed

The area around all facilities and pipelines located outside of the existing earthen dike will be graded to a sump tank which is placed at a low point of the facility. The drainage from within the earthen dike will also be directed to a new sump tank. A pump will be located in the sump tank to recirculate all spills back through the low pressure water knock out thus forming a closed system. The sump tank should be sized to contain 3 bbls/hour for 18 hours from a ruptured oil line plus 2 inches of rain water, approximately 100 bbls.

A floating boom will be installed around the oil loading and well head piers as shown. Any pollution showing within the boom area will be skimmed promptly.

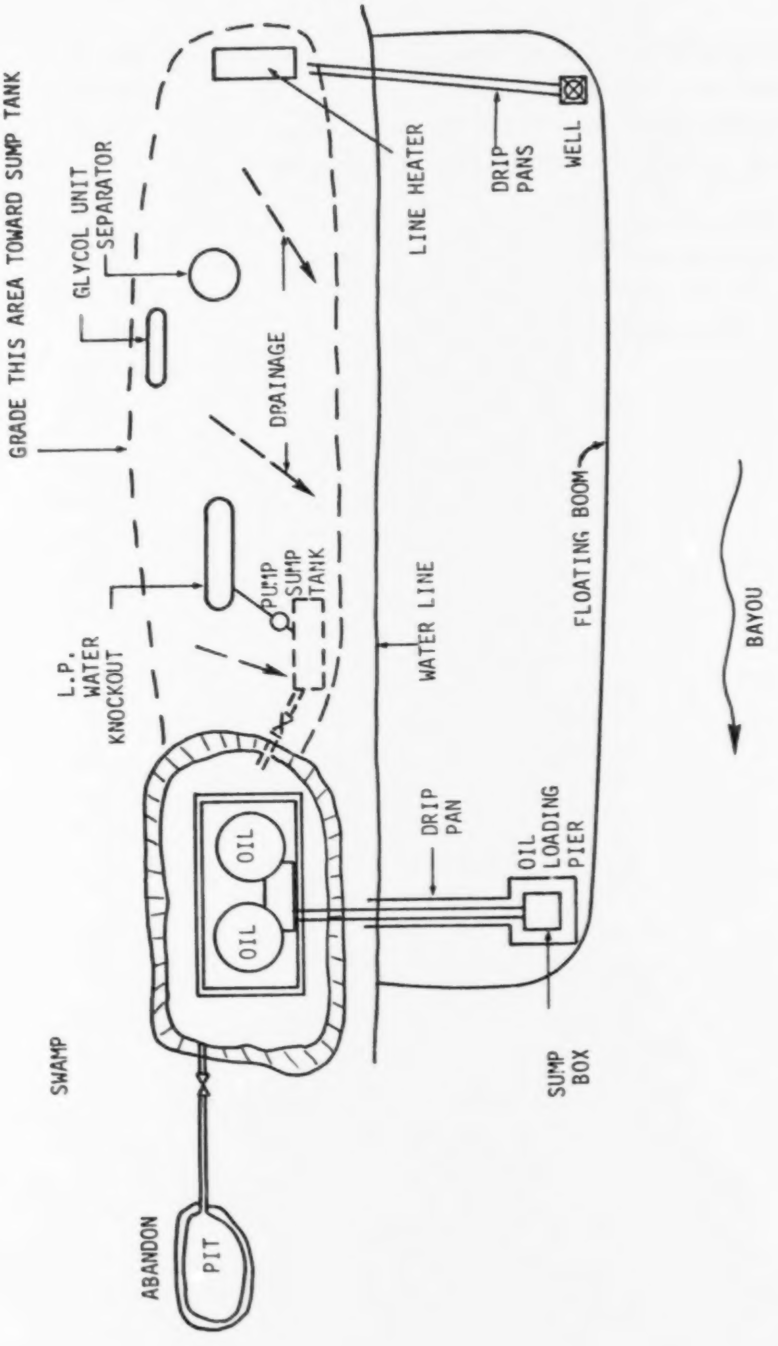
7. Inspection and Training

A daily visual inspection of all piping and equipment is made by the pumper who is experienced in oil field operation and is familiar with the SPCC Plan. All repairs and/or replacements necessary will be made promptly. Formal training and briefings on spill prevention and cleanup are given twice a year.

8. Certification

I hereby certify that this plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

Name (Print)______________________________
Registration Number________________________
State____________________________________
Signature________________________________
Date_____________________________________


GRADE THIS AREA TOWARD SUMP TANK
GLYCOL UNIT
SEPARATOR
DRAINAGE
LINE HEATER
DRIP PANS
WELL
L.P. WATER KNOCKOUT
PUMP
SUMP TANK
WATER LINE
FLOATING BOOM
BAYOU
DRIP PAN
OIL LOADING PIER
OIL
OIL
SUMP BOX
SWAMP
ABANDON
PIT

ESTIMATED COST OF IMPROVEMENTS

Assemble and Transport Material	$ 1200.00
Sump tank, 50 bbl	2160.00
Install tank	250.00
Pump & Piping from Pump to Low Pressure Water Knock out	890.00
Grading by hand 2000 S.Y. @ 1.00	2000.00
Drip Pans Loading Rank 200 L.F. @ 3.50	700.00
1100 L.F. of Floating Boom @ 12.00	13200.00
Standby & Lost Time 30% Labor	1200.00
	$21600.00

Plan 6-4

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. **Facility Information**

Name of Facility R12N T6E 76289
Type of Facility Oil Production (Intermediate)
Location of Facility ____________________

2. **Company Information**

Name of Company ____________________
Address ____________________
Phone Number ____________________
Owner ____________________
Person Responsible for SPCC Plan ____________________

3. **List of Agencies to Notify in Case of Spill**

U.S.C.G. National Response Center (800) 424-8802 (24hr.)
Federal EPA Office: Phone #__________ Location__________
State Pollution Control Office: Phone #__________ Location__________

4. **Spill History**

This facility has experienced no spills since January 10, 1973.

5. **Description of Facility**

This well is classified as an oil well producing 100 bpd of oil and 30 bpd of salt water. A minimal amount of gas is also produced, however, it is either vented to the atmosphere or used to operate pumps. Equipment used consists of: Heater treater, glycol unit and a barge containing two 5000 bbl compartments for oil and water, respectively.

The well is located in the Bayou about 100 feet from the shore line. The oil and salt water storage for this facility are located on the barge (shown in the sketch attached hereto), whereas the remainder of the facility equipment has been placed in the marsh. The barge is diked on all four sides forming a pond, the height of which is kept 2 feet below the top of the dike. The well stream flows to a heater treater for separation.

The oil and salt water subsequently flow in their respective pipe lines to separate compartments on the barge, and the small amount of gas is usually flared or used to run pumps. The oil is pumped from the barge to the loading pier and transported to another barge for delivery to the customer. The salt water is also transported by barge to a safe disposal site, since this is a fresh water area.

6. Containment and Drainage

a. Existing

Any spill or leaks resulting from the heater treater piping or glycol units located on the marsh land will immediately contaminate the shore line. A spill from the barge, however, can be contained for several days within the pond before any seepage to the surrounding water-way will result.

A sump box (drained by gravity to the pond) is located at the end of the oil loading pier. The loading hose is covered with a blind flange and kept in the sump box when not in use. The pond created by the dike surrounding the barge is sufficiently large enough to contain the contents of the oil and salt water in the barge.

b. Proposed

The area around the heater treater glycol unit and under pipe lines leading to the barge will be graded to a small sump which can be pumped out to the pond. In the event of a major spill, a surface pump will be installed to recirculate the entire contents of the pond through the heater treater, thus creating a closed system. All piping over the water from well or loading piers will have drip pans installed so spills can be conducted to the above sump. 500 L.F. of floating boom will be installed as shown on sketch. In the event of a spill, the boom will be installed downstream and a cleanup contractor called in at once.

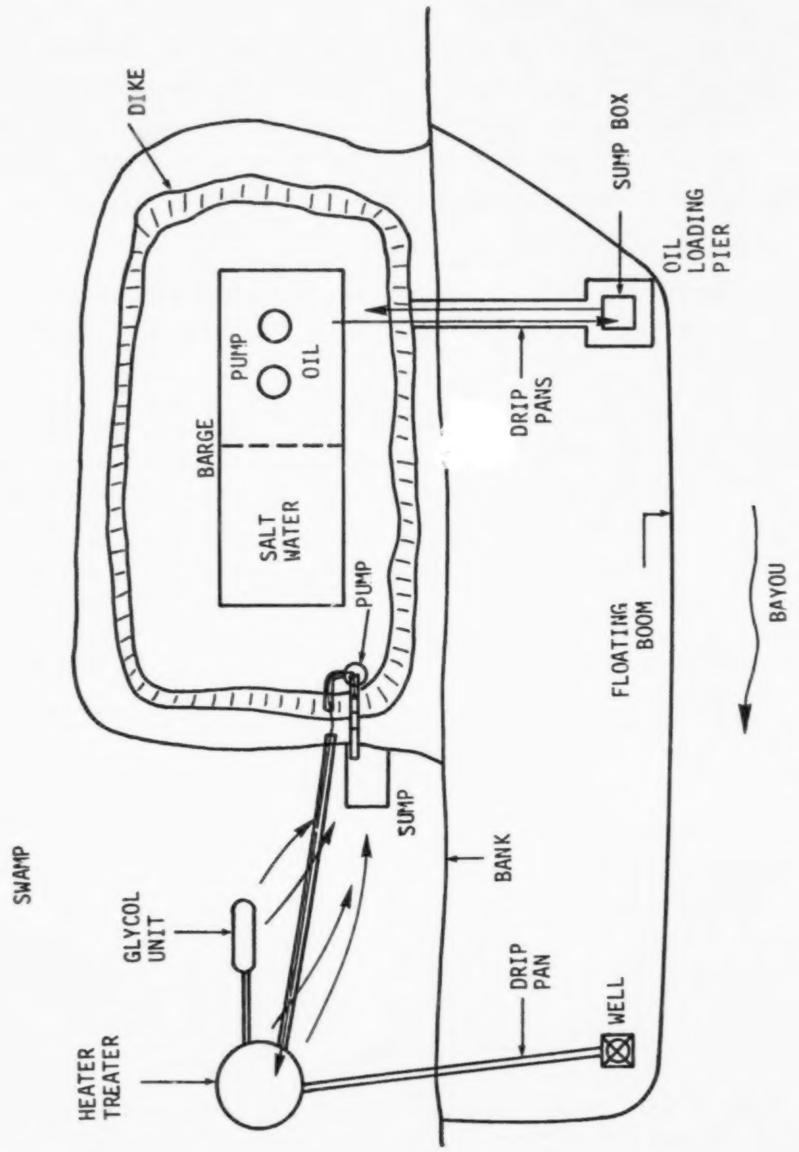
7. Inspection and Training

A daily visual inspection of all facilities is made by the pumper who is experienced in oil field operations and is familiar with the SPCC Plan. Formal training and briefings on oil spill prevention and cleanup are given twice a year. All repairs or necessary replacements are made promptly.

8. Certification

I hereby certify that this plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

Name (print)______________________________
Registration Number________________________
State___________________________________
Signature________________________________
Date____________________________________


DIKE
SWAMP
HEATER TREATER
GLYCOL UNIT
SUMP
PUMP
SALT WATER
BARGE
PUMP
OIL
DRIP PAN
WELL
BANK
DRIP PANS
SUMP BOX
OIL LOADING PIER
FLOATING BOOM
BAYOU

ESTIMATED COST OF IMPROVEMENTS

Staging and Delivery of Material	$ 1200.00
Drip Pans on Pipeline Loading Pier, 100 L.F. @ 3.50	350.00
Drip Pans on Well Line, 80 L.F. @ 3.50	280.00
Sump Tank 70 bbl, 2800 + 350 Installation	3150.00
Pump & Piping to Heater Treater	825.00
Repair Low Spots in Dike Around Barge	200.00
Grade Area to Sump 1000 S.Y. @ 1.00	1000.00
Floating Boom 500 L.F. @ 12.00	6000.00
Productivity 30% of Labor	1080.00
	$14085.00

APPENDIX G. GENERIC SPCC PLANS FOR THE PENN-GRADE REGION

Plan 7-1

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name of Facility______________________________
Type of Facility______________________________
Location of Facility__________________________

2. Company Information

Name of Company_______________________________
Address_______________________________________
Phone Number__________________________________
Owner____
Person Responsible for SPCC Plan______________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hr.)
Federal EPA Office: Phone #__________Location__________
State Pollution
Control Office: Phone #__________Location__________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility

Two samll stripper wells (1 bpd each) are located on a side hill sloping down towards the highway. Lines from these wells run along the ground to a 5 bbl water knock out tank and then to a 100 bbl capacity storage tank, setting at the side of the road. A sketch is attached hereto showing the layout of this facility. No protection or containment exists and any spill from water knock out or pipe would drain to the highway. This type of leak undetected for 24 hours could not exceed two bbls.
The oil storage tank, 100 bbls, if overfilled or if left with an open valve, would drain to the highway and to the ditch at the left and into a brook.

6. Proposed Containment and Drainage

A small ditch will be excavated around the wells, water knock out and under pipes, with excavation built up on the outside to keep out rain water from surrounding areas. See Section A-A and B-B on the attached sketch. These trenches will be connected so that all spills and leaks will be conducted to the top of the bank near the tank, thus draining into the new dike.

Around the storage tank a new earthen dike, 12" wide on top and from 12" to 15" high (> 100 bbl capacity) will be constructed along the highway and to the left of the tank tieing into the existing bank at either end. Area inside the dike will be impervious to oil spills and graded to a sump in the low corner. At this point, a 4" line with a valve will drain from sump to ditch. The valve will be locked in a closed position and all water tested before discharge.

All ditches and dike areas will be maintained to provide flow at all times and any spills or leaks cleaned up at once and stored in drums for disposal by a waste oil dealer or re-entered into the product line.

Truck loading connections will be kept inside the new dike.

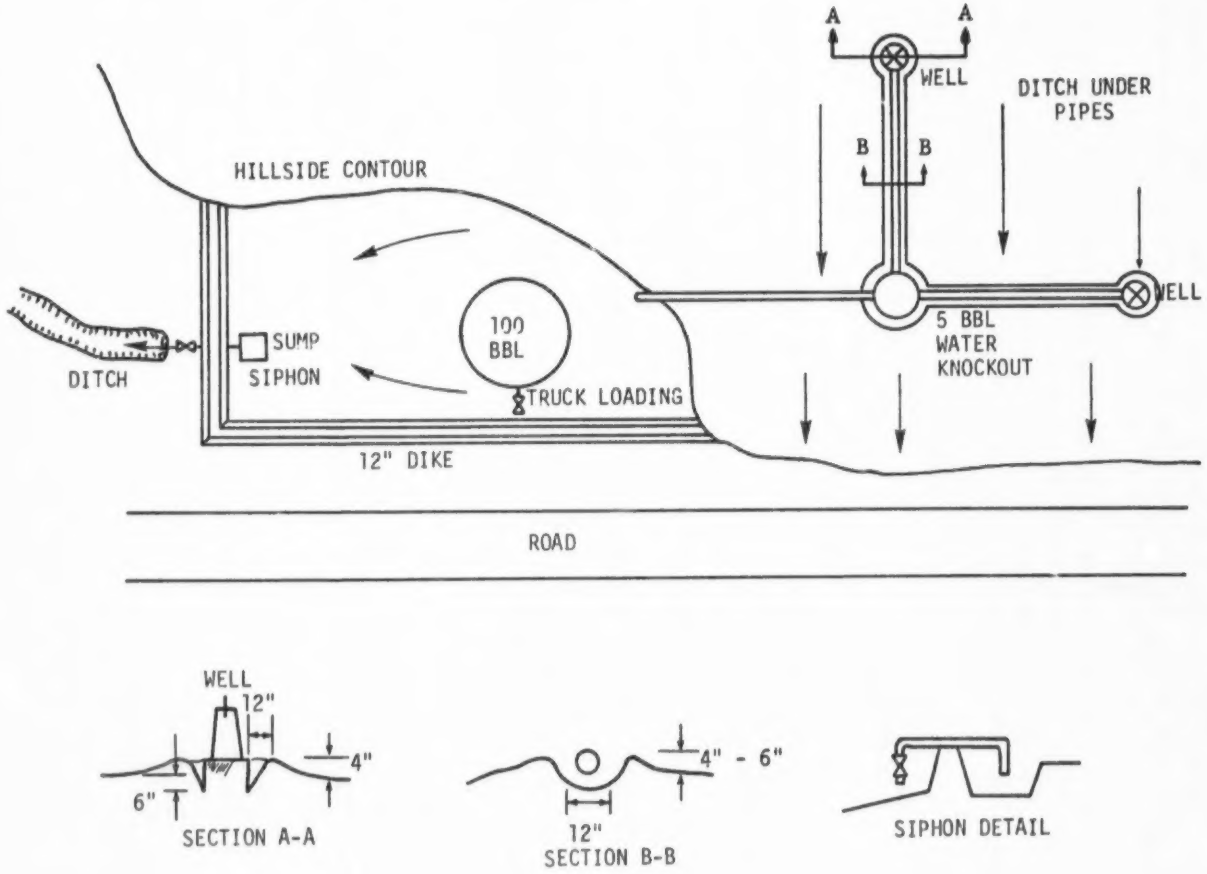
7. Inspection and Training

A visual inspection will be made three times a week and all the necessary repairs and replacements made. Spill prevention training is given twice a year, with emphasis on cleanup of ground spills.

8. Certification

I hereby certify that this plan has been prepared with good engineering judgement and fulfills the requirements of 40 CFR Part 112.

Name (Print)________________________________
Registration Number__________________________
State______________________________________
Signature___________________________________
Date_______________________________________


A
A
WELL
DITCH UNDER
PIPES
B
B
HILLSIDE CONTOUR
WELL
100
BBL
5 BBL
WATER
KNOCKOUT
SUMP
SIPHON
DITCH
TRUCK LOADING
12" DIKE
ROAD
WELL
12"
4"
6"
SECTION A-A
4" - 6"
12"
SECTION B-B
SIPHON DETAIL

ESTIMATED COST OF IMPROVEMENTS

4" Valve, 12' of 4" Pipe for Dike	$ 284.00
Rent Hand Temper for Dike Compaction 1 day @ 10.00	10.00
12" Dike Around Tank 100 L.F. (Hand @ 1.00)	100.00
Grading 80 S.Y., Hand @ 1.00	80.00
Material for Dike 12 C.Y. @ 3.00	36.00
Dig Sump in Dike, 1 C.Y. @ 10.00 (Hand)	10.00
Ditch Wells to Water KO to Dike, 500 L.F. @ 16.00/100 L.F.	85.00
Travel Time 25% @ 290.00	75.00
	$ 680.00

Plan 7-2

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name of Facility____
Type of Facility____
Location of Facility____________________________________

2. Company Information

Name of Company____
Address____
Phone Number____
Owner____
Person Responsible for SPCC Plan______________________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hr.)
Federal EPA Office: Phone #__________Location__________
State Pollution
Control Office: Phone #__________Location__________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility

The 17 wells of this facility are scattered over eight to ten acres of wooded land on both sides of a brook. The sketch attached hereto shows the layout and drainage pattern of this facility. Fifteen (15) of these wells flow by gravity to the two 100-bbl storage tanks along the highway. The remaining two wells flow to a 100-bbl tank along the brook and the oil is then pumped to the roadside tanks for delivery to the truck.

All wells are pumped and are operated by individual timing devices set to run the pump from 15 to 30 minutes, 3 or 4 times a day. The amount of oil being pumped at any given time would not exceed one or two barrels per hour.

6. Containment and Drainage

a. Existing

The only containment existing now are the pits as shown on the attached sketch. These pits are continuously drained through a 4-inch siphon arrangement as shown on the sketch attached. There are no definite means of conducting spills and leaks to these pits. The six wells along the north edge of the lease have no pits provided. Piping is run along the ground with no provision for containment of spills. The two storage tanks along the road have no dike or grading to keep spills from truck loading or overfilling from draining to highway.

b. Proposed

At the roadside tanks a three sided concrete curb will be constructed open on the bank side, and the area graded so all spills will be directed over the bank toward the pit. Dikes around this pit will be raised to provide for 18" of storage above siphon level and extended to the bank. The bank will be graded and a 6-inch dike (> 100 bbl capacity) extended up each side to concrete curbs to positively direct leaks or spills from tank to pit and keep all outside rain water from entering this area.

At the low storage tank and pump along the brook, a partial earth dike (> 100 bbl capacity) will be built on the low side to contain tank spills. A 4-inch line with valve normally closed will drain this dike to the pit southwest of the tank. With the three storage tanks now properly diked, any large spill, up to 100 bbl, from the tanks are contained.

The only remaining sources of spills or leaks will be from individual wells or lines and would never exceed 2 to 3 bbl/hour. With timing devices in operation, this would be a maximum of 2 bbl/hr x 1/2 hr x 4 operations per 24 hr, or 4 bbl total for a 24-hour period.

Where pits are adjacent to wells and piping pits will be repaired to maintain a top elevation high enough to turn all rain water that falls outside. In addition, small dikes about 6" high will be extended from pit dike to surround adjacent well or wells, insuring positive flow to wells. See sketch attached.

For the six wells along north edge we will install two new pits as shown and extend the dike around the well as shown.

Beyond this impervious containment, any leak in a line not protected will have a small pit hand excavated as soon as the leak is discovered and the spill cleaned up and hole filled with fresh dirt as soon as repairs are completed.

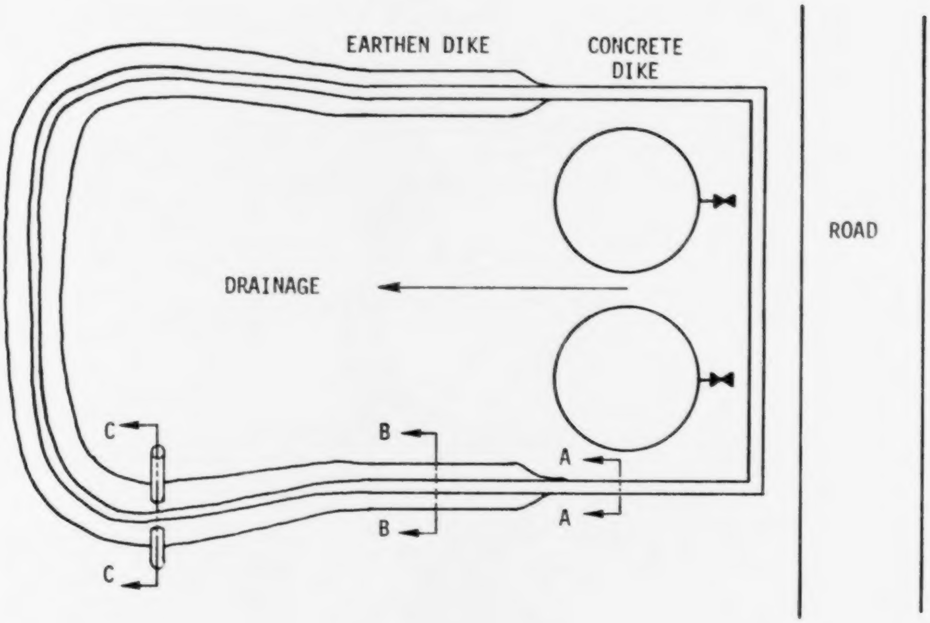
7. Inspection and Training

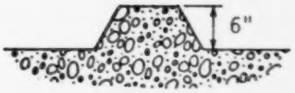
This facility is visited a minimum of once a day by the owner or a qualified person and all facilities are inspected. Any repairs or replacements needed are made promptly. Training sessions on spill prevention and cleanup are given twice a year.

8. Certification

I hereby certify that this plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

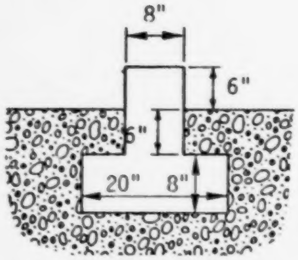
Name (Print)____
Registration Number__________________________________
State____
Signature____
Date____


EARTHEN DIKE
CONCRETE DIKE
ROAD
DRAINAGE
C
C
B
B
A
A

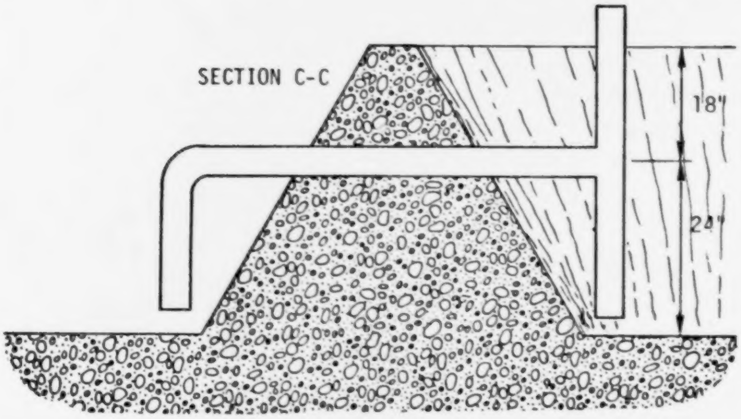


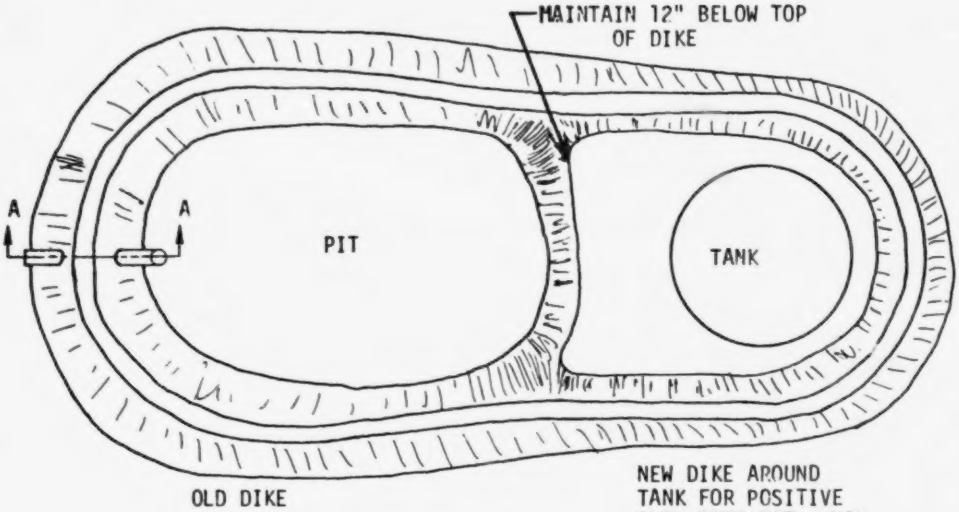
SECTION B-B

SECTION A-A

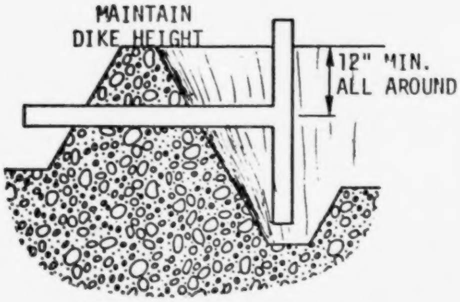


SECTION C-C

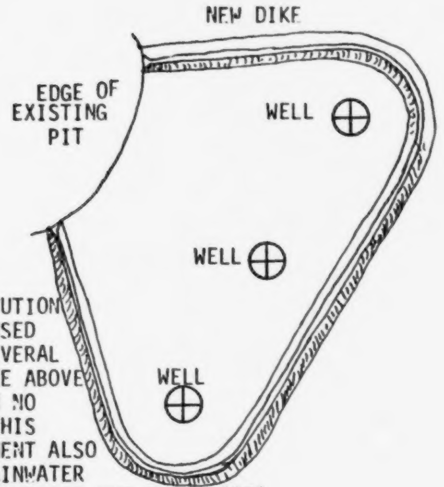



MAINTAIN 12" BELOW TOP OF DIKE
A
A
PIT
TANK
OLD DIKE

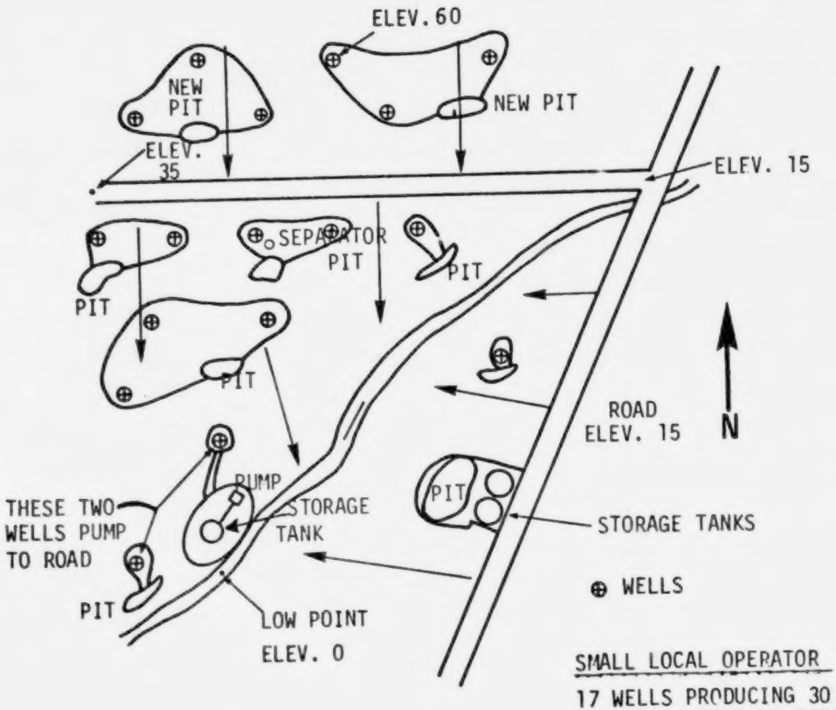
NEW DIKE AROUND TANK FOR POSITIVE FLOW INTO PIT. MAY SLOPE UP GRADE IF TANK IS HIGH. MINIMUM DIKE HEIGHT = 1 FT.


MAINTAIN DIKE HEIGHT
12" MIN. ALL AROUND

SECTION A-A


NEW DIKE
EDGE OF EXISTING PIT
WELL
WELL
WELL

THIS SOLUTION CAN BE USED WHERE SEVERAL WELLS ARE ABOVE PIT WITH NO TANK. THIS ARRANGEMENT ALSO KEEPS RAINWATER FALLING OUTSIDE THE DIKED AREA OUT OF PIT.


ELEV. 60
NEW PIT
NEW PIT
ELEV. 35
ELEV. 15
SEPARATOR PIT
PIT
PIT
PIT
ROAD ELEV. 15
N
PUMP
STORAGE TANK
THESE TWO WELLS PUMP TO ROAD
PIT
STORAGE TANKS
PIT
LOW POINT ELEV. 0
⊕ WELLS

SMALL LOCAL OPERATOR

17 WELLS PRODUCING 30 BBLS/DAY. ALL WELLS FEED TO TANK BY GRAVITY EXCEPT TWO NOTED. ALL PITS ARE NOT SHOWN.

AREA COVERED ABOUT 2000' X 2000' (NOT TO SCALE).

PIPE ABOVE GROUND EXCEPT FOR ROAD CROSSING.

PROPOSED COST OF IMPROVEMENTS

Concrete Structure at Roadside Tanks, 80 LF x 1.95 F. ÷ 27 = 6 yds @ 160.00		$ 960.00
Piping & 4" Valve @ Lower Storage Tank		284.00
Grading within Dikes and Well Area:		
17 Wells 20 x 50 = 1000 SF Road 20 x 40 = 800 SF Lower Tank 40 x 40 = 1600 SF	$\frac{3400 SF}{27}$ = 126 SF x 1.00/SY Hand	126.00
Repair 7 Pits, 1000 LF x $1.02/LF Hand		1020.00
Build 2 new Pits, Exc. 30 x 20 x 2 x 2 ÷ 27 = 90 CY (Machine) 1.00		90.00
Dike 100 LF x 1.021 LF Hand		102.00
Small Dikes around Well, 17 wells x 100 LF x .75 (Hand).		1275.00
		$3857.00
Travel Time Allowance 25%		964.00
		$4821.00

APPENDIX H. GENERIC SPCC PLANS FOR THE NEW ENGLAND REGION

Plan 8-1

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name of Facility____________________
Type of Facility_____ Fuel Oil Distributor _____
Location of Facility____________________

2. Company Information

Name of Company____________________
Address____________________
Phone Number____________________
Owner____________________
Person Responsible for SPCC Plan____________________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hr)
Federal EPA Office: Phone #__________ Location__________
State Pollution Control Office: Phone #__________ Location__________
Fire Department: Phone #__________ Location__________
Police Department: Phone #__________ Location__________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility and Containment

This facility is laid out as shown on the sketch attached hereto. There are 5 horizontal 10,000 gallon storage tanks handling #2 fuel oil. Distribution is accomplished with 2 small delivery trucks. Material is received by transport trucks not owned by this facility.

Truck spills are contained by concrete aprons and catch basins leading to a 4,000 gallon underground storage tank. This capacity is equivalent to one compartment of a transport truck.

Tank ruptures and/or pipe spills are contained within the concrete/ dike which has an overall capacity of 24,000 gallons. In the event that a small leak would squirt the contents of the tank beyond the concrete dike, the area lightly hatched between dashed lines is graded to drain the fluid to the concrete apron catch basins. Moreover, before any water is drained from the sump it is checked for pollution prior to opening the valve. All containment areas are sufficiently impervious to contain oil spills.

6. Transfer Operations

Generally, fuel oil is delivered by transport truck to the facility during normal operating hours. However, occasional after hours deliveries are made by special arrangements with the owner. The basic rules are: no smoking, shut off motor, hook truck to grounding system, check all valves (facility and truck) for proper flow and tightness, gage tanks and fill. After the delivery has been completed, this procedure is reversed. Regular delivery trucks are loaded under the same procedures except for gaging of the tanks.

7. Inspection and Records

Visual inspections are made daily of all equipment and piping; when replacement or repair is needed it is done promptly. Housekeeping is kept up and small leaks from normal operations are cleaned up immediately. No written procedures have been prepared or records kept.

8. Security

All valves permitting the outward flow from any storage tank or containment area are kept locked.

Lighting is adequate and the master switch for all pumps is located inside the warehouse.

The facility is fully fenced, gates are locked when the facility is unattended.

Vandalism or trespassing has not been experienced and no fence is provided around this facility.

9. Personnel Training and Procedures

All drivers and employees are made aware of the danger of a spill and are under orders to clean up any spill wherever it occurs. In the event of a spill, all trucks have been equipped with a shovel and absorbent material. Training sessions are given twice a year on spill prevention and cleanup methods.

10. Certification

I hereby certify that this SPCC Plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

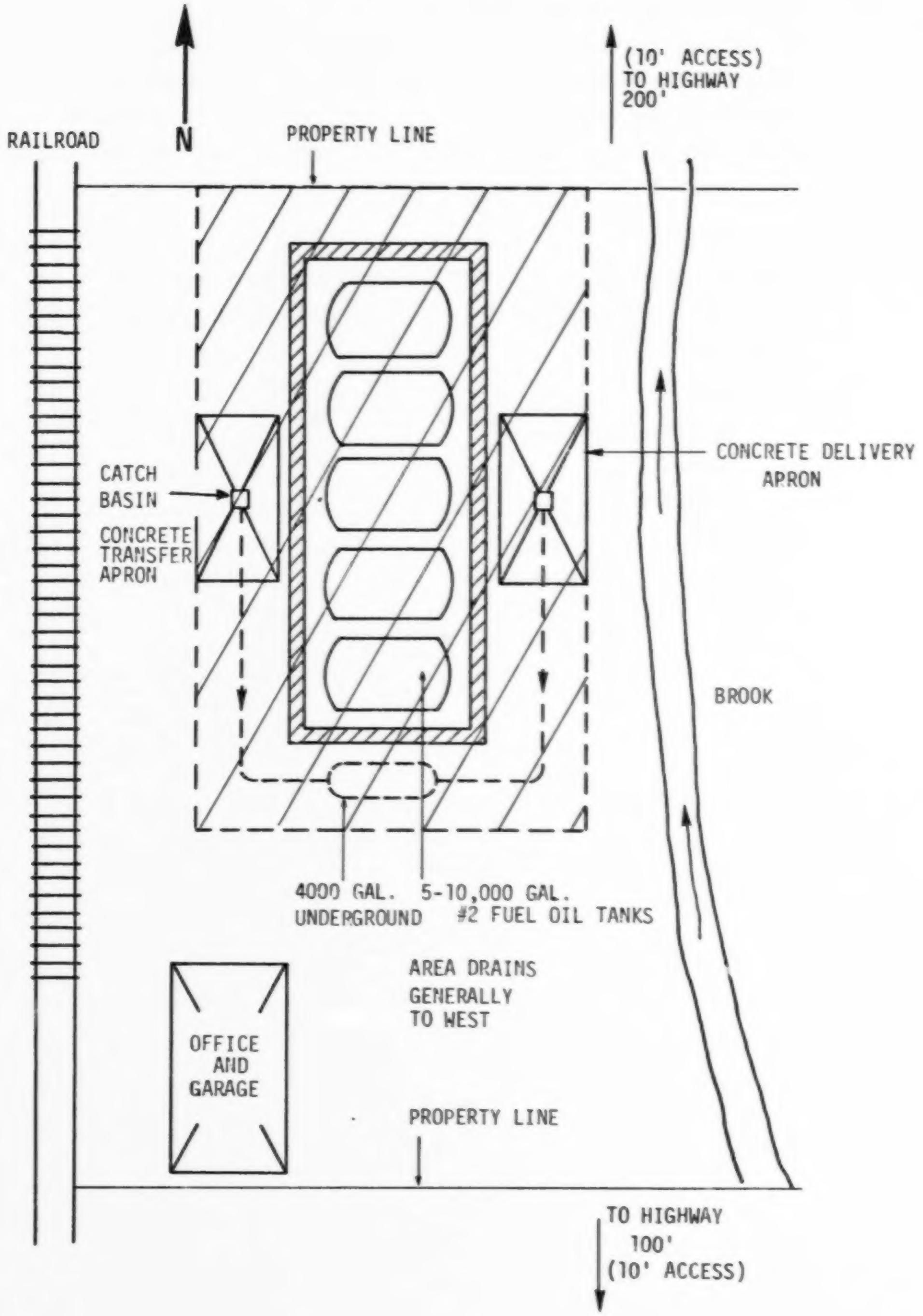
Name____

Registration Number____________________________

State____

Signature____________________________________

Date____



(10' ACCESS)
TO HIGHWAY
200'
RAILROAD
N
PROPERTY LINE
CONCRETE DELIVERY APRON
CATCH BASIN
CONCRETE TRANSFER APRON
BROOK
4000 GAL. UNDERGROUND
5-10,000 GAL. #2 FUEL OIL TANKS
AREA DRAINS GENERALLY TO WEST
OFFICE AND GARAGE
PROPERTY LINE
TO HIGHWAY
100'
(10' ACCESS)

ESTIMATED COST OF IMPROVEMENTS

Underground storage tank.............................	$ 2500.00
Lines, 100 LF of 4" pipe @ 7.00......................	700.00
2 aprons 12' x 30' x 2 = 720 SF @ 1.50..............	1080.00
2 concrete catch basins	900.00
Wall around tanks, 21 CY @ 160.00....................	3360.00
Grade area, gravel, 460 CY @ 3.00....................	1380.00
Spread gravel, lump sum..............................	120.00
	$10040.00

Plan 8-2

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name of Facility____________________________________
Type of Facility Fuel Oil Distributor
Location of Facility________________________________

2. Company Information

Name of Company_____________________________________
Address____
Phone Number____
Owner____
Person Responsible for SPCC Plan____________________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hr)
Federal EPA Office: Phone #__________ Location__________
State Pollution Control Office: Phone #__________ Location__________
Fire Department: Phone #__________ Location__________
Police Department: Phone #__________ Location__________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility and Containment

This facility is laid out as shown on the sketch attached hereto. There are seven (7) horizontal 10,000 gallon storage tanks handling #2 fuel oil. Fuel oil is received and distributed to customers by transport trucks. All trucks are owned by the facility. All flow from the facility is from the high ground (note contours) at the south end, then to a small stream. The drive beyond (left side) the tank is hard to use and a concrete retaining wall was built across the lower end of this drive, as shown, creating a storage capacity of 30,000 gallons. A locked valve is located at the lower center of the wall to control drainage from the area. A concrete fire wall is built around the tanks on the north, south and east sides, while on the west side it is a steep earth bank. A concrete apron with catch basin (> 10,000 gal. capacity) is built at the loading rack and a 4" drain line extends underground to the pit as shown. With this, all spills, leaks and rain fall are caught in this impervious containment area, which has been designed to be consistent with 40 CFR 112.7 (3) 2 ii. All discharges are made only after testing of liquid and under continuous supervision.

6. Transfer Operations

Generally, fuel oil is delivered by transport trucks during normal working hours. After-hour deliveries can be made by special arrangement with the owner. The basic rules are: no smoking, shut off motor, connect to grounding system, check all valves (facility and truck) for proper flow and tightness, gage and fill. Regular delivery trucks are loaded under the same procedures, except for gaging of tanks.

7. Inspection and Records

Visual inspections are made daily of all equipment and piping; when replacement or repair is needed it is done promptly. Housekeeping is kept up constantly and small leaks or spills from normal operations are cleaned up immediately. No written procedures have been prepared or records kept.

8. Security

All valves permitting the outward flow from any storage tank or containment area are kept locked.

Lighting is adequate and master switches for all pumps are located inside of the locked warehouse.

Entire property is fully enclosed with a 6 foot chain link fence and 2 strands of barbedwire.

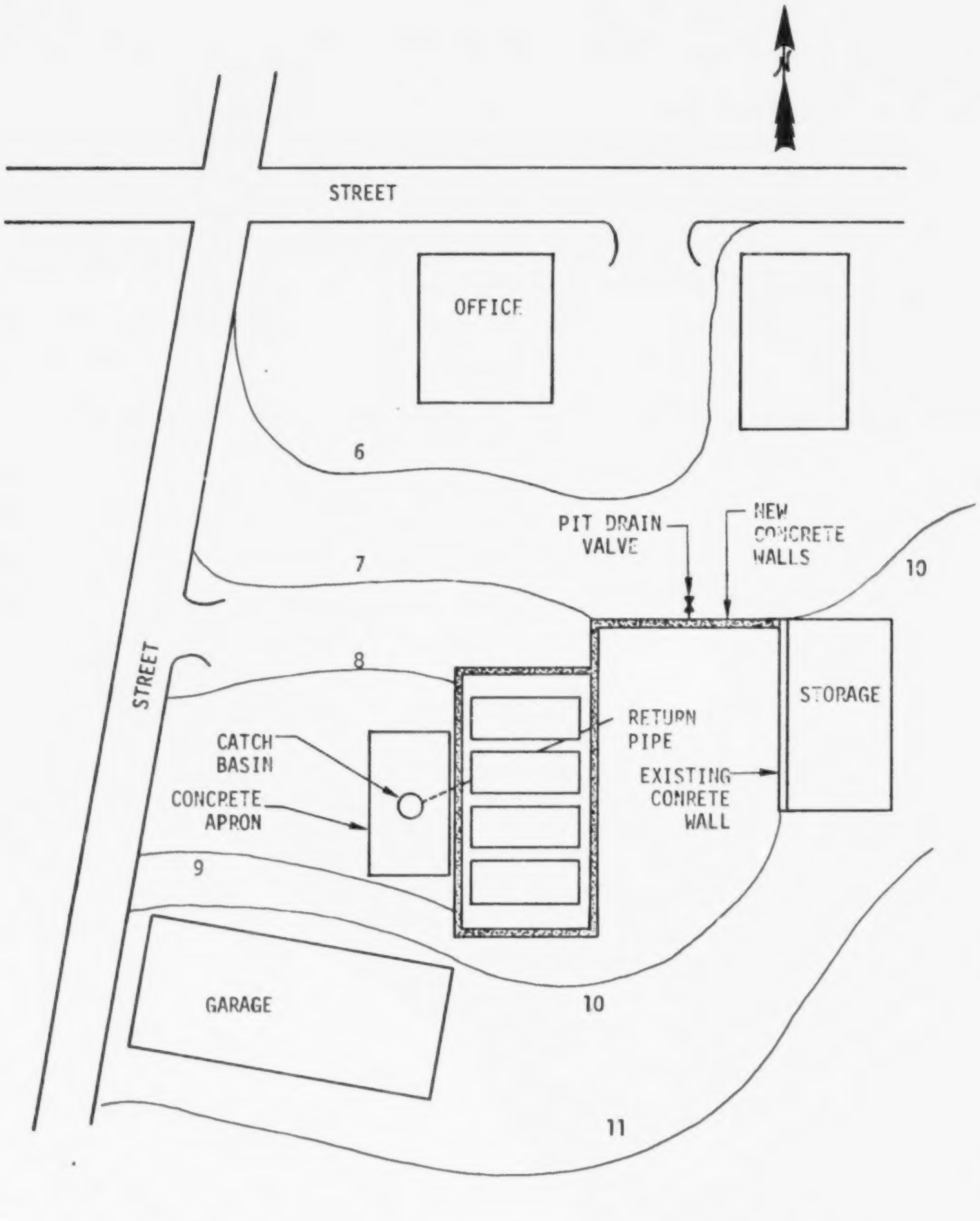
9. Personnel Training and Procedures

All drivers and employees are made aware of the danger of a spill and are under strict orders to clean up any spill immediately wherever it occurs. All trucks are equipped with a shovel and absorbent material, and some are kept at designated areas around facility. Training sessions are given twice a year on spill cleanup methods and techniques.

10. Certification

I hereby certify that this SPCC Plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

Name (Print)____
Registration Number_________________________________
State____
Signature____
Date____


N
STREET
OFFICE
6
7
PIT DRAIN VALVE
NEW CONCRETE WALLS
10
STREET
8
STORAGE
CATCH BASIN
RETURN PIPE
CONCRETE APRON
EXISTING CONRETE WALL
9
GARAGE
10
11

ESTIMATED COST OF IMPROVEMENTS

Concrete apron, 360 SF @ 1.50................	$ 540.00
Catch basin w/grade & cover..................	450.00
4" line, 80 LF @ 7.00 LF.....................	560.00
Valve through wall...........................	300.00
Concrete wall across driveway, 11 CY @ 160...	1700.00
Concrete around tanks, 9 CY @ $160...........	1440.00
	$5350.00

Note: On five facilities, owner reported a total expense of $40,000.

Plan 8-3

SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

1. Facility Information

Name of Facility ______________________
Type of Facility ______ Fuel Oil Distributor ______
Location of Facility ______________________

2. Company Information

Name of Company ______________________
Address ______________________
Phone Number ______________________
Owner ______________________
Person Responsible for SPCC Plan ______________________

3. List of Agencies to Notify in Case of Spill

U.S.C.G. National Response Center (800) 424-8802 (24hr)
Federal EPA Office: Phone # __________ Location __________
State Pollution
Control Office: Phone # __________ Location __________
Fire Department: Phone # __________ Location __________
Police Department: Phone # __________ Location __________

4. Spill History

This facility has experienced no spills since January 10, 1973.

5. Description of Facility and Containment

This facility is laid out as shown on the sketch attached hereto. There are five (5) 10,000 gallon vertical storage tanks handling # 2 fuel oil. Distribution is accomplished by use of one transport truck and two delivery trucks. This area drains from north to south and at the lower end, extending across the entire property is a 50,000 gallon capacity excavated earthen pit lined with polyethylene blanket. This pit is equipped with a locked outlet valve draining to a dry well. All spillage leaks and rainfall lead to this pit and no drainage will be made from this pit without proper inspection and supervision.

6. Transfer Operations

Fuel oil is delivered to the facility by transport truck during the normal eight hour working day, however, occasional after-hours deliveries are made in which case the owner or an employee are present to supervise the operation. The basic rules followed during loading and unloading of the tank trucks at the facility are no smoking, shut off motor, hook truck to ground system, check all valves (both facility and truck for proper positioning and tightness), and gage tanks to be filled. After delivery has been completed the reverse of this procedure is followed. These same procedures are followed with the exception of gaging the tanks when the trucks are making deliveries to customers.

7. Inspection and Records

Visual inspections are made daily of all equipment and piping and when replacement or repair is needed it is done promptly. Housekeeping is kept up and any small leaks from hose connections, valves, pipe joints are cleaned up immediately.

8. Security

A fence with a locked gate completely surrounds the entire facility. Facility lighting is adequate to detect oil spills. Flow/drainage valves, and pump starter controls, which service the storage tanks, are kept locked in the closed/off position when non-operating.

10 Certification

I hereby certify that this SPCC Plan has been prepared with good engineering judgment and fulfills the requirements of 40 CFR Part 112.

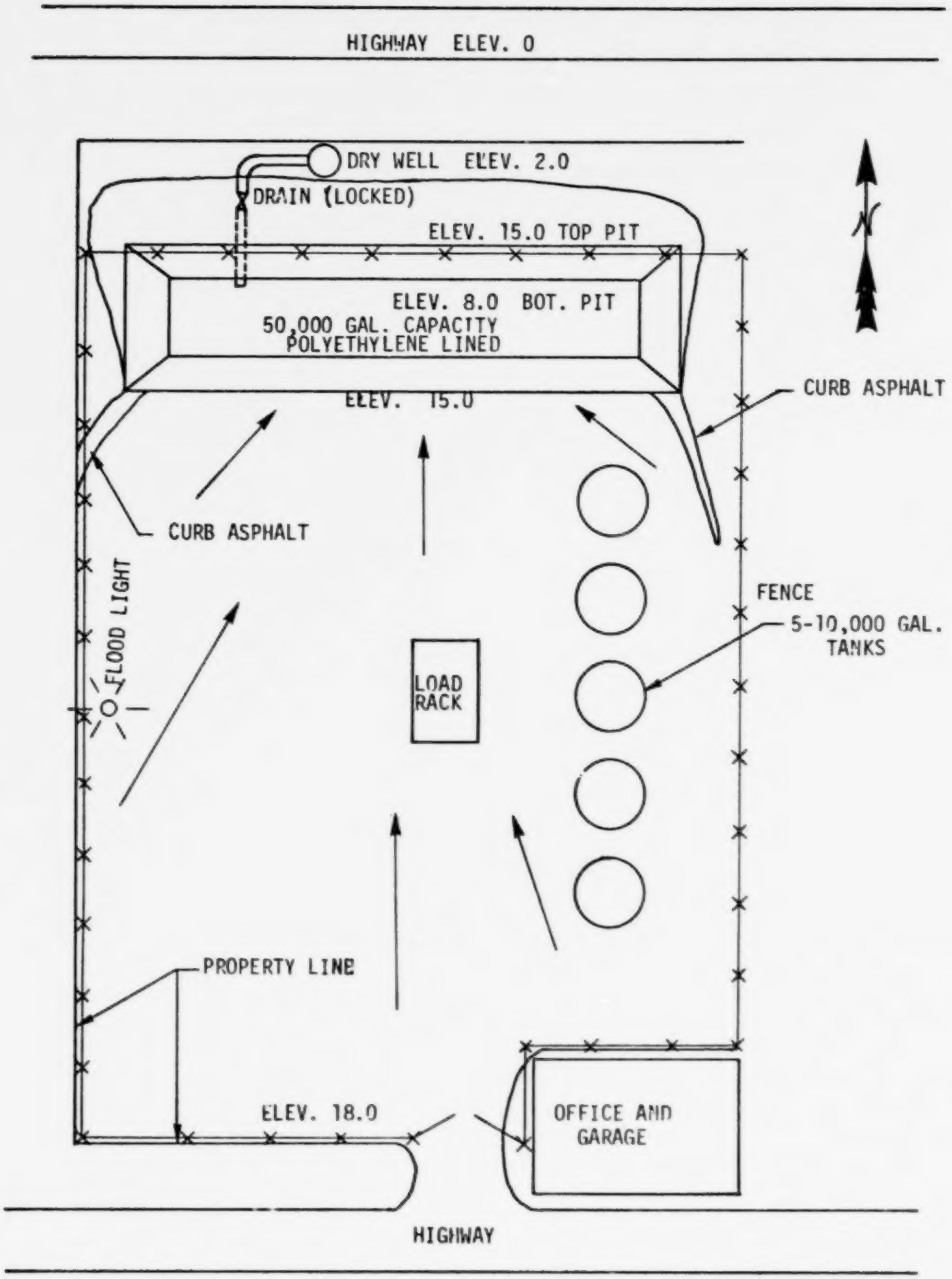
Name____

Registration Number_______________________________

State____

Signature____

Date____


HIGHWAY ELEV. 0
DRY WELL ELEV. 2.0
DRAIN (LOCKED)
ELEV. 15.0 TOP PIT
ELEV. 8.0 BOT. PIT
50,000 GAL. CAPACITY
POLYETHYLENE LINED
ELEV. 15.0
N
CURB ASPHALT
CURB ASPHALT
FENCE
5-10,000 GAL. TANKS
FLOOD LIGHT
LOAD RACK
PROPERTY LINE
ELEV. 18.0
OFFICE AND GARAGE
HIGHWAY

ESTIMATED COST OF IMPROVEMENTS

Fence and gate, 480 LF @ 10.00	$ 4800.00
Polyethylene cover 4000 SF @.045	180.00
Concrete outlet section, 13 CY @ 160	2080.00
Excavate pit, 1000 CY (Machine) @ 1.00	1000.00
Haul out material, 1000 CY @ .80 CY	800.00
Miscellaneous grading, asphalt curbs, and telephone poles to hold polyethylene cover in place	1000.00
	$ 9860.00